

Environmental Protection Agency
2004 Annual Performance Plan and Congressional Justification
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Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Strategic Goal: EPA will develop and apply the best available science for addressing current and future environmental hazards as well as new approaches toward improving environmental protection.

Resource Summary (Dollars in thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems	\$323,203.3	\$327,837.9	\$357,105.8	\$29,267.9
Conduct Research for Ecosystem Assessment and Restoration.	\$110,817.6	\$119,114.6	\$122,885.5	\$3,770.9
Improve Scientific Basis to Manage Environmental Hazards and Exposures.	\$52,022.6	\$56,355.0	\$67,467.5	\$11,112.5
Enhance Capabilities to Respond to Future Environmental Developments.	\$61,427.7	\$50,965.8	\$68,911.4	\$17,945.6
Improve Environmental Systems Management.	\$54,429.8	\$52,274.1	\$45,446.9	(\$6,827.2)
Quantify Environmental Results of Partnership Approaches.	\$9,276.2	\$9,058.4	\$9,036.8	(\$21.6)
Incorporate Innovative Approaches.	\$26,070.7	\$29,787.9	\$31,939.0	\$2,151.1
Demonstrate Regional Capability to Assist Environmental Decision Making.	\$6,088.7	\$6,591.8	\$6,607.6	\$15.8
Conduct Peer Review to Improve Agency Decisions.	\$3,070.0	\$3,690.3	\$4,811.1	\$1,120.8
Total Workyears	992.2	996.3	1,006.2	9.9

Background and Context

EPA has a responsibility to ensure that efforts to reduce potential environmental risks are based on the best available scientific information. Strong science allows us to identify the most important sources of risk to human health and the environment as well as the best means to detect, abate, and avoid possible environmental problems, and thereby guides our priorities, policies, and deployment of resources. It is critical that research and scientific assessment be integrated with EPA's policy and regulatory activities. In order to address complex issues in the future, the Agency will design and test fundamentally new tools and management approaches that have potential for achieving environmental results. Under Goal 8, EPA conducts core research to improve our understanding of the fundamental principles underlying risk assessment and risk management.

Several mechanisms are in place to ensure a high-quality research program at EPA. The newly established Science Advisor will be responsible for ensuring the availability and use of the best science to support Agency policy and decisions, as well as advising the EPA administrator on science and technology issues and their relationship to Agency policies, procedures and decisions. The Research Strategies Advisory Committee (RSAC) of EPA's Science Advisory Board (SAB), an independent chartered Federal Advisory Committee Act (FACA) committee, meets annually to conduct an in-depth review and analysis of EPA's Science and Technology account. The RSAC provides its findings to the House Science Committee and sends a written report on the finding to EPA's Administrator after every annual review. Also, under the Science to Achieve Results (STAR) program all research projects are selected for funding through a rigorous competitive external peer review process designed to ensure that only the highest quality efforts receive funding support. In addition, EPA's scientific and technical work products must undergo either internal or external peer review, with major or significant products requiring external peer review. The Agency's Peer Review Handbook (2nd Edition) codifies procedures and guidance for conducting peer review.

Today's environmental innovations extend beyond scientific and technological advances; they also include new policies and management tools that respond to changing conditions and needs. Examples include market-based incentives that provide an economic benefit for environmental improvement, regulatory flexibility that gives companies more discretion in how specific goals are met, and disclosure of information about environmental performance. As a result of these and other innovations, the nation's environmental protection system is evolving. EPA's focus is on creating a system that is more efficient and effective and more inclusive of all elements of society.

Means and Strategy

EPA is continuing to ensure that it is a source of strong scientific and technical information, and that it is on the leading edge of environmental protection innovations that will allow achievement of our strategic objectives. The Agency consults a number of expert sources, both internally and externally, and uses several deliberative steps in planning its research programs. As a starting point, the Agency draws input from the draft Ecosystem Protection

Multi-year Plan, the EPA Strategic Plan, available research plans, EPA program offices and Regions, Federal research partners, and outside peer advisory bodies such as the Science Advisory Board (SAB) and others. Agency teams that prioritize research areas by examining risk and other factors such as National Science and Technology Council (NSTC) research, involved with development priorities, client office priorities, court orders, and legislative mandates use this input internally. EPA's research program will increase our understanding of environmental processes and our capability to assess environmental risks to both human health and ecosystems.

In the area of ecosystem protection research, EPA will strive to establish baseline conditions from which changes, and ultimately trends, in the ecological condition of the Nation's aquatic ecosystems can be confidently documented, and from which the results of environmental management policies can be evaluated at regional scales. This ability to demonstrate success or failure of increasingly flexible watershed management policies, regionally and nationally, is of great importance. Also in FY 2004, EPA's ecosystem protection research methods will continue to focus on Environmental Monitoring and Assessment Program (EMAP), which includes the National Coastal Assessment (Coastal 2000), Western EMAP, Central Basin, work in landscape ecology, and programs to develop and refine environmental indicators. These programs will provide water resource managers with tools necessary to measure status and trends in the condition of the Nation's rivers, streams, and estuaries and to measure the impacts of management decisions. This work is an important step toward providing the scientific understanding to measure, model, maintain, and restore the integrity and sustainability of ecosystems.

The Agency's leadership role in protecting both human and ecosystem health requires that the Agency continue to be vigilant in identifying and addressing emerging issues. EPA will continue to enhance its capabilities to anticipate, understand, and respond to future environmental developments. EPA will address these uncertainties by conducting research in areas that combine human health and ecological considerations. Continued research in the areas of endocrine disrupting chemicals and mercury is leading toward the development of improved methodologies for integrated human health and environmental risk assessment and sound approaches for risk management. While EPA has long benefited from studies needed to reduce, refine, and replace test methods, the Computational Toxicology program will enable EPA to demonstrate how to reduce the cost and use of animal testing to a far greater extent by prioritizing data requirements. In FY 2004, EPA will develop a computational toxicology research strategy that will help fill major data gaps for a large number of chemicals for testing programs and reduce the cost and use of animal testing. This work will improve the validity of existing and proposed chemical testing programs through computational toxicology research, which integrates modern computing with advances in genomics to develop alternatives to traditional animal testing approaches. EPA will also conduct research to enhance its capacity to evaluate the economic costs and benefits and other social impacts of environmental policies. These efforts, undertaken in concert with other agencies, will result in improved methods to assess economic costs and benefits, such as improved economic assessments of land use policies and improved assessments for the valuation of children's health, as well as other social impacts of environmental decision-making.

The Agency also seeks to characterize, prevent, and clean up contaminants associated with high-priority human health and environmental problems through the development and verification of improved environmental tools and technologies. EPA will incorporate a holistic approach to pollution prevention by assessing the interaction of multiple stressors that may threaten human health and environmental quality, and by developing cost-effective responses to those stressors. Research will also explore the principles governing sustainable systems and the integration of social, economic, and environmental objectives in environmental assessment and management. Emphasis will be placed on developing and assessing preventive approaches for industries and communities having difficulty meeting pollution standards. In a broader context, the pollution prevention research program will continue expanding beyond its traditional focus on the industrial sectors to other sectors (e.g., municipal) and ecosystems.

In FY 2004, EPA will improve its regulatory and policy development process. The Agency will strengthen the policy analysis and use of science supporting key regulatory and non-regulatory actions, improve the economic analysis underlying Agency actions, and improve the regulatory and policy action information management system.

EPA is continuing to ensure that it is a source of sound scientific and technical information, and that it is on the leading edge of environmental protection innovations that will allow achievement of our strategic objectives. Also, in FY 2004, EPA is requesting resources for the newly established Science Advisor. The Science Advisor will be responsible for ensuring the availability and use of the best science to support Agency policies and decisions, as well as advising the EPA administrator on science and technology issues and their relationship to Agency policies, procedures, and decisions. The Science Advisor's office will require a small cadre of senior staff to promote effective partnerships with EPA Programs and Regions, assist them in their efforts to strengthen environmental science, and provide for timely and open communication on critical science matters. In addition, the Agency consults a number of expert sources, both internal and external, and uses several deliberative steps in planning its research programs. As a starting point, the Agency draws input from the EPA Strategic Plan, available research plans, program offices and Regions, Federal research partners, and outside peer advisory bodies such as the Science Advisory Board (SAB) and others. The Agency is also taking a number of steps to attract and maintain a high quality, diverse scientific workforce. EPA will explore using existing personnel authority or seek new authority to recruit and retain talented research scientists that EPA might not otherwise be able to attract.

The Agency also seeks to develop and verify improved tools, methodologies, and technologies for modeling, measuring, characterizing, preventing, controlling, and cleaning up contaminants associated with high priority human health and environmental problems. In order to do this, EPA will develop, evaluate, and deliver technologies and approaches that eliminate, minimize, or control high-risk pollutants from multiple sectors. Emphasis will be placed on preventive approaches for industries and communities having difficulty meeting control/emission/effluent standards.

EPA's strategy for solving environmental problems and improving our system of environmental protection includes developing, implementing and institutionalizing new policy tools, collaborative community-based and sector-based strategies, and the capacity to experiment, test, and disseminate innovative ideas that result in better environmental outcomes. In each area, EPA is looking to advance the application of the innovative tool or approach by promoting broader testing into our system of environmental protection and to support collaborative partnerships for environmental management based upon prudent analysis and decision methodologies. For example, EPA's Sector Program Plan 2001-2005 sets forth a vision and specific actions to enhance the effectiveness of innovative sector activities (at the Federal and state levels) and to fully integrate sector approaches into the Agency's overall mission and core programs. Similarly, EPA is strengthening its capacity to evaluate innovative approaches and make institutional changes that adopt successful innovations.

EPA's community-based approach aims to provide integrated assessment tools and information and direct assistance for environmental protection in partnership with local, state, and Tribal governments. The work focuses on building the capacity of communities to work effectively at identifying and solving environmental issues in ways that support healthy local economies and improved quality of life.

Sector strategies complement current EPA activities by allowing the Agency to approach issues more holistically; tailor efforts to the particular characteristics of each sector; identify related groups of stakeholders with interest in a set of issues; link EPA's efforts with those of other agencies; and craft new approaches to environmental protection. EPA is building on successful experiences from its current sector-based programs such as the Sustainable Industries Partnership Programs, Design for the Environment, and sector-based compliance assistance programs to expand the ways in which the Agency is working in partnership with industry sectors to meet high environmental standards using flexible, innovative approaches. These innovative programs foster the development of innovations at the industry sector level, testing new regulatory ideas, technologies, tools, and incentives in non-adversarial settings. In a somewhat related effort, EPA is exploring the potential for broader use of a sector-based regulatory model for small businesses that was developed by Massachusetts.

Strategic Objectives

- Conduct Research for Ecosystem Assessment and Restoration
- Improve Scientific Basis to Manage Environmental Hazards and Exposures
- Capabilities to Respond to Future Environmental Developments
- Improve Environmental Systems Management
- Quantify Environmental Results of Partnership Approaches
- Incorporate Innovative Approaches
- Demonstrate Regional Capability to Assist Environmental Decision Making
- Conduct Peer Review to Improve Agency Decisions

Highlights

Research for Ecosystem Assessment and Restoration

In order to balance the growth of human activity with the need to protect the environment, it is important to understand the current condition of ecosystems, what stressors are changing that condition, what the effects are of those changes, and what can be done to prevent, mitigate, or adapt to those changes. In FY 2004, the Environmental Monitoring and Assessment Program (EMAP) will continue to be a major contributor to EPA's environmental indicators report and will be instrumental in improving state contributions to the Agency's bi-annual report to Congress on the condition of the Nation's waters. Included within EMAP is the Western EMAP (a.k.a. Western Pilot), which continues the study of streams in the Western U.S., and will begin focused studies in selected estuarine and near-shore sites. Regional EMAP projects (R-EMAP) in FY 2004 are high priority activities for Regional Offices because they will provide opportunities for EPA's Regions to test new technologies and work directly with state and academic partners. The Regional Vulnerability Assessment (ReVA) program further supports the needs of programs and Regions using information from EMAP and other sources to demonstrate an approach to Regional-scale assessment that efficiently informs decision-makers.

Another aspect of EMAP extends to the large rivers of the Mississippi River Basin (the Central Basin). Through cooperative programs with the Regions, states, Tribes, and other Federal agencies in the Central Basin, EPA proposes to fill remaining scientific gaps (indicators, sampling design, and sampling methodology) currently limiting our ability to measure the condition of large rivers. These approaches and technologies developed will be transferred to the many responsible parties to help inform environmental management decisions affecting these rivers as well as the Gulf of Mexico. Furthermore, landscape ecology research will focus on improving estimates of the effects of land-based stressors on aquatic, estuarine, wetland, terrestrial, and landscape conditions.

In FY 2004 the Agency will strengthen the initiative for Invasive Species Great Lakes research. The research will focus on developing innovative monitoring approaches and models to predict the spread of aquatic invasive species, and on identifying habitats and regions at risk to invasive species. Successful rapid response requires both early detection of new invaders and a prediction of their spread based on the patterns of invasion vectors (e.g., shipping) and the inherent vulnerability of different ecosystems to invasion. To date, monitoring for water quality (e.g., 305b Clean Water Act), early detection of invasive species, predicting the spread of invasive species, and predicting the vulnerability of ecosystems to invasions have largely been disjunct activities. The overall goal of this initiative is to develop integrated methods of detecting and predicting the spread of new invasive species introduced into the Great Lakes.

Research for Human Health Risk Assessment

In order to improve the scientific basis for identifying, characterizing, assessing, and managing environmental exposures that can pose the greatest health risks to the American public, EPA is committed to developing and verifying innovative methods and models for assessing the

susceptibilities of sub-populations, such as children and the elderly, to environmental toxins. Since many of the current human health risk assessment methods, models, and databases are based on environmental risks for adults, efforts under this goal are primarily aimed at enhancing current risk assessment and management strategies and guidance to better consider risk determination needs for children. In FY 2004, research will focus on reducing the uncertainty in EPA risk assessments for children through collection and analysis of data on children's exposures and identifying critical data gaps in conducting cumulative risk assessments. This information will be useful in determining whether children are more susceptible to environmental risks than adults and how to better assess potential risks to children.

EPA's Children's Health Research Program will continue to play a critical role in shaping how the Agency addresses children's environmental health issues. The Agency will work on guidance for conducting risk assessments for children. The guidance will address issues such as critical windows of vulnerability (by organ system and endpoint), mechanisms of action, and use of pharmacokinetic data and models in risk assessments. In 2004, EPA will complete an updated Child-Specific Exposure Factors Handbook to be used throughout the scientific community, including government, academia, and the private sector. EPA will also enhance its efforts in Asthma research. Research will examine the toxic effects of aldehydes and bioaerosols on children's lung function.

The Agency will continue its participation with the Department of Health and Human Services in the National Children's Study (NCS). In FY 2004, EPA will: 1) develop and test sampling methods for cost-effective measurement of environmental agents in air, water, soil, food, and indoor environments; 2) develop and test methods to collect biological samples from, and test for effects in, infants and children; 3) develop and test questionnaires that elicit information through questions, that are accurate surrogates of exposure and effects measurements; and 4) develop methods to identify highly-exposed and symptomatic individuals for over-sampling.

In FY 2004, EPA will complete a restricted-access database of EPA experts with knowledge, expertise, and experience to rapidly assess health and ecological impacts focused on safe buildings and rapid risk assessment as a part of the Agency's Homeland Security efforts. The goal of this effort is make available key EPA staff and managers who might be called upon to rapidly assess the impacts of a significant terrorist event.

Lastly, research in support of the Agency's annual State of the Environment Report will move EPA beyond its historic reliance on output indicators (e.g., decreased emissions/discharges; increased facilities in compliance) to more direct outcome measures (e.g., improved ecological conditions, reduced human exposures, reduced illness and disease).

Research to Enhance Environmental Decision Making

In recent years, EPA has begun to move beyond environmental regulation to anticipate and prevent potential problems before they evolve into major concerns. In FY 2004, research will focus on: 1) improving our understanding of the impacts of potential exposure to environmental pollutants, particularly endocrine disrupting chemicals (EDCs) and mercury; 2) human health and the environment; and 3) developing approaches to reduce human health and ecological risks. This research will result in accessible methodologies for combined human health and ecological risk assessments. New work in FY 2004 includes: Computational Toxicology to enhance the risk assessment process for EDCs; multi-pollutant research to support the reduction of atmospheric mercury emissions under the President's Clear Skies Initiative; and research to support the Report on the Environment.

The emerging sciences of genomics, computational methods, and bioinformatics have created a new opportunity to revolutionize the science used in chemical risk assessment. In FY 2004, EPA will produce a peer-reviewed Computational Toxicology Research Strategy describing how this program will provide the proof-of-concept for several EPA problems involving the testing requirements for endocrine disruptors and a complex class of new pesticides where cumulative risks are a concern. The overall goal of the computational toxicology research program is to develop more efficient approaches through integration of modern computing with advances in genomics to reveal the sequence of events by which aggregate and cumulative exposures to chemicals can cause adverse effects in humans and a large number of natural populations and to incorporate the use of these methods in risk assessments.

In FY 2004, the Agency's Clear Skies research will focus on mercury by collecting data at power plants to evaluate the performance of continuous emission monitors (CEMs) and initiate laboratory studies to improve EPA's understanding of atmospheric mercury fate and transport. This research will provide the science needed to reduce the uncertainties limiting the Agency's ability to assess and manage health risks from mercury and assist decision-makers in choosing the best technology to reduce mercury emissions.

EPA will also direct special grant solicitations to support research at Minority Institutions. This program specifically assists minority institutions in establishing and supporting environmental research activities that will build capacity to assess and solve environmental problems. Also, in FY 2004, EPA will fund Graduate fellowships to scientists across multiple disciplines, including the biological and physical sciences, mathematics, computer sciences, and engineering. Research completed under the fellowship program helps resolve uncertainties associated with particular environmental problems and focuses graduate research on priority research areas.

Research to Improve Environmental Systems Management

In FY 2004, the Agency will continue its systems-based approach to pollution prevention, which will lead to a more thorough assessment of human health and environmental risks and a more comprehensive management of those risks. Other research in this area will develop methodologies to better convey the social, economic, and environmental costs and benefits of reducing environmental risks. EPA will develop tools and methodologies to prevent pollution at its source and will evaluate environmental technologies through the Environmental Technology Verification (ETV) program. ETV is a voluntary, market-based verification program for commercial-ready technologies made up of stakeholders who represent diverse interests within the environmental arena. The goal of ETV is to verify the performance characteristics of private-sector-developed technologies so that purchasers, users, and permit writers have the information they need to make environmentally sound decisions. Technology verifications during FY 2004 will focus on advanced monitoring; air pollution control; greenhouse gas abatement; drinking water systems; and water protection. Additionally, through the National Environmental Technology Competition (NETC), EPA will recognize and reward innovative technologies that produce more effective and lower cost solutions to environmental problems. In FY 2004, EPA plans to develop competitive solicitations for cost-effective technologies to remove arsenic from drinking water to help small communities meet the new arsenic drinking water standard.

Regulatory and Policy Development

EPA will continue to improve its regulatory and policy development process by strengthening the policy analysis of key regulatory and non-regulatory actions, improving the economic analysis underlying Agency actions, improving the regulatory and policy action information management system, and creating innovative strategies to assist states in solving environmental problems.

Increased Community-Based Approaches

The Agency will continue to implement Regional Geographic Initiatives (RGI) which enable EPA Regional offices to partner with states, local governments, private organizations, and others to solve environmental problems that are of particular local concern to the Regions and states.

Science Advisory Board Peer Review and Consultations

In FY 2004, the Agency will increase its support for activities, principally peer reviews, of the SAB, which aims to provide independent technical advice to Congress and the Administrator on scientific, engineering, and economic issues that serve as the underpinnings for Agency positions, from research direction to regulations. The SAB helps the Agency to "do the right science" and to use the results of that science appropriately and effectively in making regulatory decisions. In so doing, the SAB aims to promote sound science within the Agency

and a wider recognition of the quality of that science outside the Agency. In this regard, the SAB is active in consulting with the Agency on how to incorporate science appropriately and effectively into the new approaches the Agency is using to make environmental decisions.

External Factors

Strong science is predicated on the desire of the Agency to make human health and environmental decisions based on high-quality scientific data and information. This challenges the Agency to perform and apply the best available science and technical analyses when addressing health and environmental problems that adversely impact the United States. Such a challenge moves the Agency to a more integrated, efficient, and effective approach of reducing risks. As long as sound science is a central tenant for actions taken by the Agency, then external factors will have a minimal impact on the goal.

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Conduct Research for Ecosystem Assessment and Restoration.

Provide the scientific understanding to measure, model, maintain, and/or restore, at multiple spatial scales, the present and future integrity of highly valued ecosystems.

Resource Summary (Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Conduct Research for Ecosystem Assessment and Restoration.	\$110,817.6	\$119,114.6	\$122,885.5	\$3,770.9
Environmental Program & Management	\$7,157.6	\$5,960.1	\$7,801.4	\$1,841.3
Hazardous Substance Superfund	\$0.0	\$21.6	\$2.1	(\$19.5)
Science & Technology	\$103,660.0	\$113,132.9	\$115,082.0	\$1,949.1
Total Workyears	350.0	350.9	346.6	-4.3

Key Program (Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Coastal Environmental Monitoring	\$7,325.3	\$7,671.2	\$7,801.1	\$129.9
Congressionally Mandated Projects	\$7,770.9	\$0.0	\$0.0	\$0.0
Ecosystems Condition, Protection and Restoration Research	\$66,707.9	\$67,202.1	\$68,407.6	\$1,205.5
Environmental Monitoring and	\$32,360.0	\$38,259.6	\$38,873.3	\$613.7

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Assessment Program, EMAP				
Facilities Infrastructure and Operations	\$5,320.2	\$4,963.5	\$5,651.4	\$687.9
Homeland Security-Preparedness, Response and Recovery	\$65.5	\$0.0	\$0.0	\$0.0
Management Services and Stewardship	\$1,044.9	\$1,018.2	\$1,793.4	\$775.2
Planning and Resource Management	\$0.0	\$0.0	\$358.7	\$358.7

FY 2004 Request

The nation's ecosystems provide valuable services to the public, such as air and water purification, flood control, food, and raw materials for industrial processes, as well as multiple recreational benefits. Many human activities alter or damage ecosystems and their ability to provide these goods and services. To balance environmental sustainability with the growth of human activity, it is important to understand the condition of ecosystems, the stressors changing that condition, the consequences of those changes, and the consequences of preventing, mitigating, or adapting to those changes. EPA's ecological research program has four primary areas of emphasis: 1) ecological condition; 2) ecological diagnosis; 3) ecological forecasting; and 4) ecological restoration. In order to provide focus to this research, EPA's ecological research program builds upon the Agency's 1997 Ecological Research Strategy. This strategy is supplemented by the draft Ecosystem Protection Multi-year Plan and helps EPA focus efforts on environmental problems that pose the greatest risks and provides a framework for integrating research across laboratories and centers and across GPRAs goals. To ensure quality, all scientific and technical work products undergo either internal or external peer review, with major or significant products requiring external peer review. Activities under the ecosystem protection program include: the Environmental Monitoring and Assessment Program (EMAP), the National Coastal Assessment (Coastal 2000), Western EMAP, the Central Basin Integrated Assessment, the Regional Vulnerability Assessment (ReVA), landscape sciences, and environmental indicators.

Ecological Condition Research

EPA's ecological condition research efforts consist, in large part, of the various components of the Environmental Monitoring and Assessment Program (EMAP). EMAP focuses on the monitoring science required to develop EPA's capability to measure trends in freshwater and marine ecosystem health. EMAP research efforts are guided by the EMAP

Research Strategy, published in 2001. EMAP includes the National Coastal Assessment (NCA), Western EMAP, the Central Basin Integrated Assessment, work in landscape ecology, and programs to develop and refine environmental indicators. Under the National Coastal Assessment program, EPA is partnering with 24 marine coastal states and Puerto Rico, the U.S. Geological Survey (USGS), and the National Oceanic and Atmospheric Administration (NOAA) to conduct the sampling of estuaries using probabilistic sampling methods. As a result of this sampling the condition of near-shore coastal ecosystems will be determined and a report drafted in FY 2004 on the condition of coastal ecosystems in the western U.S. The Western EMAP (a.k.a. Western Pilot) study will also continue as a primary activity of EPA's monitoring research. This study has four areas of focus: 1) the landscape atlas for western states; 2) intensive study of three watersheds (Columbia River basin, Missouri River basin, and San Francisco Bay region); 3) Pacific coast monitoring; and 4) a western-wide stream survey. In FY 2004 the Western Pilot will continue with the study of streams in the western U.S. and will continue focused studies in selected estuarine and near-shore sites. These two programs will provide water resources managers with the tools necessary to measure status and trends in the condition of the nation's streams and estuaries and to measure the impacts of management decisions.

EPA is also refining and extending the EMAP approach to large rivers in the Mississippi River Basin (the Central Basin). Central Basin rivers are challenged by long-term loadings of nutrients, sediments and toxic chemicals as well as extensive habitat alterations. The resulting inputs to the Gulf of Mexico are a significant contributor to causes of hypoxia, loss of wildlife habitat, and water quality concerns. In FY 2004 EPA will begin the first full year of monitoring to measure the condition of these large rivers. EPA will also conduct sampling on the upper Missouri River and seek to develop partnerships with states and other federal agencies in order to develop an integrated basin monitoring approach in the Central U.S. Data from such monitoring can help inform environmental management decisions regarding these rivers, and provide support to managers in establishing total maximum daily loads and meeting water quality standards. In addition, there are important scientific linkages between the Central Basin effort and proposed watershed mitigation and management efforts. The health of these large rivers is linked to the conditions of small streams, and ultimately their watersheds. Determining the condition of large rivers and understanding the processes occurring in the watersheds will be important for diagnosing the causes of impaired conditions in these river systems.

Landscape ecology research focuses on improving estimates of the effects of land-based stressors on aquatic, estuarine, wetland, terrestrial, and landscape conditions. It also extends the EMAP probability sampling design to estimate conditions of ecological resources across the West through the application of spatially-distributed models. Landscape characterization research includes: 1) planning and generating land characteristic databases for determining current conditions and change (land cover and other spatial databases); 2) continuing remote sensing research and developing high resolution imagery applications to document changes in land cover over time; and 3) quantifying relationships between landscape metrics and specific parameters. This research will significantly improve EPA's ecological monitoring and assessments, as well as risk management decisions, and will reduce uncertainty in other high

priority research programs. The Landscape Sciences Program is contributing a national assessment of riparian habitat conditions to the Committee on Environmental and Natural Resources' (CENR) National Environmental Report. This report will fit into the framework for conducting a national landscape assessment by the year 2008.

Environmental indicators research will focus on: 1) development of the next generation of biological indicators to characterize ecosystem condition and diagnose exposure to specific stressors; 2) application of these indicators to the monitoring of aquatic ecosystems; and 3) interpretation of the indicators in ecological risk assessments. These indicators include new condition indicators (e.g., genetic diversity of aquatic species) and new multi-metric methods (e.g., prototype indicators for deep rivers) to assess aquatic ecosystem population and community integrity. In FY 2004 new ecological indicators, including genetic and landscape, will be developed and evaluated using EPA's Indicator Guidelines. Also, prototype indicators of condition for deep river fish and population genetics data will be developed, which are unique to ecological integrity studies. This will provide inherent measures of population fitness and sustainability, which can be associated with historic or anthropogenic stresses. The research will include the use of DNA microarray technology to develop highly specific and sensitive diagnostic indicators of exposure to chemical stressors for which no current measures of bioavailability exist (e.g., pesticides). This technology will be used to develop methods capable of simultaneous measurement of the bioavailability of several chemical stressors to aquatic species exposed to mixtures.

Ecological Diagnosis Research

Diagnosis Research (i.e., process and modeling) addresses biological, chemical, and physical processes affecting the condition of ecosystems and their responses to stressors. This modeling allows for predictions of future landscapes, stressor patterns, ambient conditions, and receptor responses. Predicting the impact of changes in conditions allows resource managers to address problems in ways that will more effectively achieve their environmental protection goals.

Since measurements are not feasible in every watershed because of cost and other practical constraints, landscape indicators offer an efficient means to detect change, measure watershed level stressors, and quantify relationships between landscape metrics and specific parameters. A new generation of wall-to-wall spatial data (e.g., Multi-Resolution Landscape Characterization land cover data, North American Landscape Characterization historical landscape data), and advances in geographic information systems (GIS) make it possible to evaluate the compositional and spatial pattern of landscape characteristics. Using this information, local, state and Federal managers can diagnose causes and forecast future conditions in a scientifically defensible fashion to more effectively protect and restore valued ecosystems. Landscape ecology research efforts will result in a national assessment of landscape change between the early 1970's and early 2000's, evaluation of the consequences of these changes on aquatic resources, and development of national assessments of riparian habitat conditions. Additional research in FY 2004 will focus on habitat distribution data needed for enhanced

capabilities to measure how wildlife habitat is distributed at the appropriate resolution for spatially-explicit risk assessment.

EPA will also conduct research to address the effects of excess nitrogen from atmospheric or other sources and aquatic ecosystems, including the development of models that predict the loading-response relationships for nitrogen in aquatic habitats and improved knowledge of the biogeochemical processes controlling nutrient processes in watersheds. Such models can be used for stressor source apportionment and for the assessment of management and mitigation strategies. In addition, deposition of nitrogen, along with other atmospheric stresses such as sulfur, will be monitored throughout the northeastern U.S. to continue to evaluate the effectiveness of existing regulations on the control of the major constituents of acid rain and the recovery of impacted streams, rivers, and lakes. Additional research will include investigation into the fate, behavior, and effects of natural organic nitrogen and controls on the mobility and availability of phosphorous.

Other ecological process and modeling research will include the development of approaches for evaluating relative risks from chemical and nonchemical stressors on fish and wildlife populations across large areas or regions. Research in this area will improve the ability to perform retrospective (diagnostic) and prospective (forecasting) assessments of risks to biota as determined by the spatial distribution of habitat quality and stressors (e.g., toxic chemicals, nutrients, disease, invasive species) in the landscape. Research results can be used to describe habitat requirements for wildlife and to manage watersheds to achieve and maintain desired ecological conditions, using biological indicators and metrics to determine the condition of aquatic ecosystems. In FY 2004, EPA will provide environmental managers with a prototype multimedia modeling system for small watershed scale contaminated site assessments, such as those addressed by the Resource Conservation and Recovery Act (RCRA), Superfund, the Clean Air Act (CAA), and the Clean Water Act (CWA). This multimedia modeling system will be used for model selection, integration, and execution and provide guidance for incorporating environmental and chemical data, chemical fate/effects process models, and ecosystem models for the development of site specific remediation options. This research supports the Administration's priority for Networking and Information Technology Research and Development.

Ecological Forecasting Research

EPA's ecological forecasting research (i.e., risk assessment) addresses the risk posed to ecosystems by stressors, alone and in combination, now and in the future. Ecological assessments can link stressors with consequences and evaluate the potential for damage to particular ecosystems, and can be used to compare the relative risks associated with different stressors, regional areas, and ecosystems. This research is developing tools to enable environmental risk managers at local, state, and Federal levels to identify priority sensitive ecosystems.

The completion of the Mid-Atlantic Integrated Assessment (MAIA) in FY2002 provided baseline information on the current status of most resources in the region. Continuing research in FY 2004 will build on MAIA and other data to project future environmental conditions in the region so that risk management activities can be targeted proactively. The Regional Vulnerability Assessment (ReVA) project, begun in FY 2000, will continue to combine modeled projections of changes in stressors (e.g., pollution deposition, land use change) with information on sensitive ecosystems in order to identify: 1) the greatest environmental risks likely to arise in the next 5-25 years, and 2) where those risks are likely to occur.

The ReVA project continues to show that invasive species are major stressors on ecological resources and will pose significant threats in the future. Thus, in FY 2004, the Agency will strengthen the initiative for Invasive Species Great Lakes research. The research will focus on developing innovative monitoring approaches and models to predict the spread of aquatic invasive species, and on identifying habitats and regions at risk to invasive species. Successful rapid response requires both early detection of new invaders and a prediction of their spread based on the patterns of invasion vectors (e.g., shipping) and the inherent vulnerability of different ecosystems to invasion. To date, monitoring for water quality (e.g., 305b Clean Water Act), early detection of invasive species, predicting the spread of invasive species, and predicting the vulnerability of ecosystems to invasions have largely been disjunct activities. The overall goal of this initiative is to develop integrated methods of detecting and predicting the spread of new invasive species introduced into the Great Lakes. Achieving this goal will require coordination among researchers in several different fields, federal, state, and local regulatory agencies, and NGOs. To foster this coordination and to better refine which potential invaders and invasion models to focus the subsequent research on, a workshop will be held in FY 2004. The workshop shall be held in the Great Lakes region with the objective of developing a draft strategy. This research strategy will guide the Agency's research efforts to develop integrated monitoring approaches for new invaders and develop the models to predict their spread.

Ecological Restoration Research

EPA's risk management and restoration research focuses on the options available to manage the risks to, and restoration of, degraded ecosystems. The growth rate of the man-made environment necessitates development of cost-effective prevention, control, and remediation approaches for sources of stressors and adaptation approaches for ecosystems. These technologies will diagnose ecosystem restoration needs, evaluate progress toward restoration, and establish ecologically relevant goals and decision support systems for state and community planners. EPA is developing integrated restoration technologies which focus on: 1) rehabilitating, to the extent possible, the structure of watershed ecosystems (e.g., restoring riparian zones); 2) reducing the perceived stressors (e.g., cleaning up contaminated sediments); and 3) enhancing the natural resilience of the system. EPA will also develop tools to assess the progress, effectiveness, and cost of candidate restoration technologies, including the development of methods for evaluating negative or unexpected impacts of the restoration technology. Utilizing this research, local, state and Federal managers can protect and restore aquatic ecosystems using scientifically defensible methods. This research will also be

incorporated into restoration protocols to allow more uniform approaches to determining effectiveness and cost, which will relate to potential results in public benefits. Additional research in FY 2004 will address sediment transport and Best Management Practices (BMPs) to evaluate and identify sediments as a primary impairment to streams. Additional efforts will also focus on constructing wetlands as restoration tools, and interception zones for watershed stressors.

EPA Science Advisor

In FY 2004, EPA is requesting resources to support the Science Advisor. The Science Advisor will be responsible for ensuring the availability and use of the best science to support Agency policies and decisions, as well as advising the EPA Administrator on science and technology issues and their relationship to Agency policies, procedures, and decisions. The Science Advisor's office will require a small cadre of senior staff to promote effective partnerships with EPA Programs and Regions, assist them in their efforts to strengthen environmental science, and provide for timely and open communication on critical science matters.

FY 2004 Change from FY 2003 Request

S&T

- (+\$1,270,000) These resources will be used to strengthen core research efforts in ecological diagnosis research (i.e., process and modeling), which will address how biological, chemical, and physical processes affect the condition of the ecosystems; and ecological restoration research will identify how to effectively reduce risks to protect ecosystems and restore them once they have become degraded.

- \$ (+\$806,800, +6.0 FTE) This increase is a redirection of 1.0 FTE from Goal 2, Objective 2 (water quality) and a reorientation of 5 workyears within Goal 8, Objective 1 to support the Agency's FY 2003 initiative to assess the condition of large rivers in the Central Basin. The approaches and technology developed will be transferred to the many responsible parties within the Basin to enable coordinated, scientifically defensible, long-term monitoring. These redirections will not cause significant impacts.

- \$ (+\$1,160,300, +3.5 FTE) These resources will support the newly established EPA Science Advisor. Three of the workyears are being redirected from within this Objective and from Objective 3 Goal 2 (Watersheds and Aquatic Communities), while the remaining workyears will be part of the Agency's effort to enhance its scientific workforce by attracting first-rate postdoctoral scientists and engineers into its research program. The Science Advisor will be responsible for ensuring the availability and use of the best science to support Agency policies and decisions, as well as advising the Administrator on science and technology issues and their relationship to Agency policies, procedures, and decisions.

- (+\$462,340, +2.2 FTE) Workyears and associated costs supporting landscape ecology research and assessment activities are being realigned from Global Change Research Goal 6, Objective 2 and consolidated in Goal 8, Objective 1, Ecosystems Research. There is no programmatic impact.
- (+\$500,000) This increase for the Invasive Species research will focus developing innovative monitoring approaches and models to predict the spread of aquatic invasive species, and on identifying habitats and regions at risk to invasive species in the Great Lakes region.
- \$ (-\$1,343,400, -7.0 FTE) Resources are being redirected from research on ecosystem assessment and restoration to fund the Agency's initiative in Computational Toxicology in Goal 8, Objective 3 (Enhanced Capabilities to Respond to Future Environmental Development). This will cause slight delays in the work on integration of ecological models with multimedia fate and transport models, and will slightly delay the development of tools necessary to manage multiple stressors at the watershed scale.
- (-\$943,600) Resources are being redirected to support research on indicators of ecosystem health and water quality in Waste Management (Goal 5). This includes relatively minor reductions to a number of areas within the ecosystem research program. For example, some of the work to develop a set of ecological and socioeconomic indicators will be reduced. The impact will be mitigated by the fact that some of the redirected resources will continue to support related work.
- (-\$701,000, -5.0 FTE) This reflects a reorientation within the EMAP program to support the Central Basin integrated assessment.
- (-\$323,020, -3.1 FTE) This reflects a realignment of research support workyears to Goal 2, Objective 2. There are no programmatic impacts.
- (-\$248,600, -2.0 FTE) This reflects a realignment of regulatory support workyears to Goal 8, Objective 3 to better reflect the multimedia nature of this effort.
- (-\$262,080, -2.6 FTE) These workyears are being redirected from research on ecosystem assessment and restoration to support the Agency's Homeland Security efforts in the area of Rapid Risk Assessment and Water Security. This will cause slight delays in the work on integration of ecological models with multimedia fate and transport models, and will slightly delay the development of tools necessary to manage multiple stressors at the watershed scale.

EPM

- (+\$1,134,400, +3.2 FTE) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters' contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. (Total changes -> rent: +\$1,417,000, utilities: +\$2,374,800, Security: +\$3,425,000 and 75 FTE, Human Resources: +\$870,400 and +5.4 FTE, Contracts: +\$642,400 and -18.5 FTE, Grants: +\$3,015,500 and +19.7 FTE)

There are additional increases for payroll, cost of living, and enrichment for new and existing FTE.

GOAL: SOUND SCIENCE, IMPROVED UNDERSTANDING OF ENV. RISK AND GREATER INNOVATION TO ADDRESS ENV. PROBLEMS

OBJECTIVE: CONDUCT RESEARCH FOR ECOSYSTEM ASSESSMENT AND RESTORATION.

Annual Performance Goals and Measures

Research

Regional Scale Ecosystem Assessment Methods

In 2004 Provide Federal, state and local resource managers with a means to more effectively determine long-term trends in the condition and vitality of Eastern U.S. stream ecosystems through measurements of changes in the genetic diversity of stream fish populations.

Performance Measures:

FY 2002
Actuals

FY 2003
Pres. Bud.

FY 2004
Request

A study of fish genetic diversity that demonstrates the power of this emerging technology for evaluating condition and vitality of biotic communities to Federal, state and local resource managers.

1 report

Baseline:

The development and application of new and more powerful methods to evaluate ecological integrity is central to many state and Federal assessment programs, including EPA's Environmental Monitoring and Assessment Program (EMAP) and Regional Vulnerability Assessment (ReVA) program. Technological progress in the fields of molecular biology and genetics have allowed, for the first time, the cost-effective analysis of patterns in the genetic diversity of aquatic populations over large regional scales. This genetic information brings new and powerful information to our understanding of aquatic ecosystems, including the identification of appropriate ecological assessment units, the linkages between environmental condition and population responses, and estimates of the future susceptibility of populations due to loss of genetic diversity. In FY 2004, a report will be prepared that summarizes the results of research on the genetic diversity of indicator fish species inhabiting Wadeable streams in EMAP's Mid-Atlantic Integrated Assessment (MAIA) area, as well as in parts of Ohio that were evaluated as part of a regional EMAP assessment. This report will provide resource managers and the public with a more complete understanding of the present condition of these biological resources and their vulnerability to predicted environmental changes.

Verification and Validation of Performance Measures

FY 2004 Performance Measure: A study of fish genetic diversity that demonstrates the power of this emerging technology for evaluating condition and vitality of biotic communities to Federal, state and local resource managers.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Report

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

Coordination with Other Agencies

Research in ecosystems protection is coordinated government-wide through the Committee on Environment and Natural Resources (CENR). It is the unique mission of EPA to look beyond specific resource management responsibilities such as those assigned to other agencies like the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service, U.S. Department of Agriculture's (USDA) Forest Service, and the Department of the Interior's (DOI) Fish and Wildlife Service (USFW) and Bureau of Land Management, and to protect the whole environment, accounting for both public and private sources of adverse ecological effects. EPA has been an active participant in the CENR, and all work in this objective is fully consistent and complementary with other Committee member activities.

EPA researchers work within the CENR on EMAP and other ecosystems protection research. The Mid-Atlantic Landscape Atlas was developed in cooperation with NOAA, USFW, the University of Tennessee, and the U.S. Department of Energy's (DOE's) Oak Ridge National Laboratory. Development of the Networking and Information Technology Research & Development (NITR) Modeling System is coordinated with the Army Corps of Engineers (USACE), USDA, and DOE. EPA cooperates with the CENR's Subcommittee on Ecological Systems, in the restoration of habitats and species, impacts of landscape change, invasive species and inventory and monitoring programs. A draft Ecological Research Strategy underwent

interagency peer review by the Committee on Environmental and Natural Resources (CENR) in June 1997 and external peer review by the Science Advisory Board's Ecological Processes and effects Committee (SAB-EPEC) in July 1997. The strategy was revised in response to SAB-EPEC suggestions and interagency comments, and the final document was published in June 1998.

EPA is working through interagency agreements with the USACE on the development of tools for the management of stressors in reservoir and lake watersheds and the establishment of an approach for the development of decision support systems to manage these types of ecosystems. Through interagency agreements with the U.S. Geological Survey (USGS), EPA has worked to investigate and develop tools for assessing the impact of hydrogeology on riparian restoration efforts. This work also focuses on development of tools for the dispersal modeling of invasive species, the evaluation of the effectiveness of restoration efforts to reconnect groundwater and surface water hydrology, and the establishment of zones of denitrification within impaired streams. The collaborative work with the USGS continues to play a vital role in investigating the impact and fate of atmospheric loadings of nitrogen and nitrogen applications as part of restoration technologies on terrestrial and aquatic ecosystems. All of these efforts have significant implications for risk management in watersheds, total maximum daily load (TMDL) implementation, and management of non-point source pollutants.

Additional interagency grants programs in Ecology include: the Ecology and Oceanography of Harmful Algal Blooms (EcoHAB) program with NOAA, NSF, DOD, and NASA; nutrient science for watershed management with USDA; and the Estuarine and Great Lakes (EAGLES) program with NASA.

Statutory Authorities

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

Toxic Substances Control Act

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

Resource Conservation and Recovery Act (RCRA)

The Clean Air Act Amendment

The Safe Drinking Water Act

Pollution Prevention Act (PPA) (42 U.S.C. 13101-13109)

Clean Water Act (CWA) Title I (33 U.S.C 1251-1271)

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Improve Scientific Basis to Manage Environmental Hazards and Exposures.

Improve the scientific basis to identify, characterize, assess, and manage environmental hazards and exposures that pose the greatest health risks to the American public by developing models and methodologies to integrate information about exposures and effects from multiple pathways. This effort includes focusing on risks faced by susceptible populations, such as people differentiated by life stage (e.g., children and the elderly) and ethnic/cultural background.

Resource Summary (Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Improve Scientific Basis to Manage Environmental Hazards and Exposures.	\$52,022.6	\$56,355.0	\$67,467.5	\$11,112.5
Environmental Program & Management	\$3,409.1	\$2,937.3	\$3,663.1	\$725.8
Science & Technology	\$48,613.5	\$53,417.7	\$63,804.4	\$10,386.7
Total Workyears	172.6	176.0	180.4	4.4

Key Program (Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Congressionally Mandated Projects	\$731.3	\$0.0	\$0.0	\$0.0
Endocrine Disruptor Research	\$369.3	\$372.2	\$378.9	\$6.7
Facilities Infrastructure and Operations	\$2,656.7	\$2,505.1	\$2,979.1	\$474.0

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Homeland Security-Preparedness, Response and Recovery	\$360.1	\$0.0	\$8,560.6	\$8,560.6
Human Health Research	\$47,225.6	\$51,824.5	\$53,633.9	\$1,809.4
Legal Services	\$51.0	\$54.8	\$57.2	\$2.4
Management Services and Stewardship	\$410.7	\$377.4	\$596.4	\$219.0
Planning and Resource Management	\$0.0	\$0.0	\$30.4	\$30.4
Research to Support FQPA	\$1,217.0	\$1,221.0	\$1,231.0	\$10.0

FY 2004 Request

EPA's human health research program is based on the assumption that major uncertainties in risk assessment can be reduced through a better understanding of the fundamental determinants of exposure and dose and the basic biological changes that result from one or more exposures to one or more chemicals. Historically, EPA focused its human health risk management decisions and regulations on single environmental pathways and individual contaminants. Often, environmental legislation mandated this approach. In recent years, however, advances in the state of environmental science have illustrated that new risk assessment methods are needed to investigate complex environmental and human health issues that were not contemplated by early environmental statutes.

There are many uncertainties associated with the risk assessment process because of severe limitations in available data and the complex interactions between the sources and environmental concentrations of contaminants, human exposures to these contaminants, and relationships between human exposure, dose, and response. These uncertainties frequently result in the use of default assumptions and uncertainty factors in risk assessments. EPA's human health research program addresses these data limitations in an attempt to reduce reliance on default assumptions. The measurement-derived tools (databases, methods, models, and protocols) developed through this program will strengthen the scientific foundation for human health risk assessment.

This goal is supported by multiple long-range research planning documents, including: 1) the draft Human Health Research Strategy, 2) the Research Strategy on Environmental Risks to Children; 3) the Asthma Research Strategy; and 4) the Draft Multi-Year Plan for Human Health Risk Assessment. These long-term strategies and planning documents allow EPA to improve the scientific basis to identify, characterize, assess, and manage environmental exposures that pose the greatest health risks to the American public. In the context of performance (or program

outcomes), the Government Performance and Results Act (GPRA) requires federal organizations to establish and publish performance goals in an Annual Performance Plan and report on the extent to which they achieve those goals in Annual Performance Reports. The Human Health Research Program is also subject to the requirements of GPRA.

In FY 2004, human health research will be conducted under three activities: 1) development of multimedia, multipathway exposure methods and models; 2) development of mechanistically-based data, tools, and approaches; and 3) development of innovative methods and models for assessing risks to susceptible sub-populations. These three themes are further partitioned into a series of targeted programmatic areas, which are discussed in further detail below.

Multimedia, Multipathway Exposure Methods and Models

EPA is committed to filling critical data gaps that reduce reliance on default assumptions and improves the risk assessment process. One key way to accomplish this goal is by developing models to assess, predict, and diagnose the population distribution of multimedia, multipathway exposures to major classes of environmental agents. Research activities in this area will address substantial uncertainties that exist in human health risk assessment and thereby improve the scientific basis for assessing and managing risks.

Through the exposure research program, EPA will develop methods, measurement data, and measurement-derived models that estimate source emission, aggregate and cumulative exposures and source-exposure-dose relationships for contaminant mixtures to which the general population, children, and other susceptible populations are exposed daily. Research will continue to focus on developing, evaluating, and enhancing multimedia, multipathway exposure modeling modules, which are key devices in linking environmental concentrations with human actions to estimate real-world exposures. Other research will look at exposure-dose modeling to describe the uptake of pollutants into the body and the distribution of pollutants throughout the body. These models provide the essential linkage between regional environmental or micro-environmental models and the corresponding dose-response models designed by toxicologists.

EPA also conducts exposure research through relatively large-scale exposure measurement studies such as the National Human Exposure Assessment Survey (NHEXAS), the Children's Total Exposure to Pesticides and Other Persistent Pollutants (CTEPP), and other related exposure measurement programs, which integrate measurements and modeling to investigate critical information gaps about targeted sub-populations and population-scale distributions of exposures to contaminant mixtures. In FY 2004, the Agency will compare and evaluate new data on exposure factors and develop updated recommendations for assessment. EPA will use this new data - from surveys such as CTEPP, NHEXAS, and the National Health and Nutrition Examination Survey (NHANES) - to analyze issues such as use of short-term data for longer-term estimates and uncertainties introduced by the use of data collected for other purposes.

In FY 2004, a major population-based field study that focuses on children's aggregate exposure to pesticides and other selected toxics in homes, day care centers and schools will continue. This study will be completed in 2005 with delivery of major products in the 2005 – 2007 timeframe. Study results will be used to:

- Evaluate and refine a protocol for measuring aggregate exposure for children of different age groups;
- Verify those pathways and activities that represent the highest exposures to children;
- Generate high quality distributional data on exposure concentrations, estimated exposures, and exposure factors;
- Develop a children's exposure measurements data base for model development, evaluations, refinement, and risk assessments;
- Develop a measurement database for model evaluations and risk assessments; and
- Provide input into the design and implementation of the National Children's Study (NCS).

The field study will develop essential information for improving models that represent dermal uptake and exposure, dietary exposure and gastrointestinal uptake, and aggregate exposure. Researchers within EPA, the scientific community, and the pesticide and chemical industry, will use the final protocol to develop high quality data on exposure and exposure factors mandated by the Food Quality Protection Act.

Mechanistically-based Data, Tools, and Approaches

There is a lack of understanding about the underlying biological, chemical, and physical processes that determine target tissue exposures and effects, which limits the Agency's ability to assess potential health risks of environmental exposures. Insufficient knowledge of these processes introduces uncertainties into the risk assessment process that may allow for wide interpretation of what is often limited data. Research in this area addresses both qualitative (hazard identification) and quantitative (dose-response analysis) concerns associated with current risk assessments.

In order to reduce uncertainties in the risk assessment process, health effects research will continue to focus in two areas: harmonization of risk assessment approaches and chemical mixtures. Research to harmonize risk assessment approaches will yield a consistent set of principles and guidelines for drawing inferences from scientific information, including the need for consistent application of all pertinent information on toxicity, dosimetry, and mode-of-action in all risk assessments.

Research on chemical mixtures will focus on understanding mechanisms or modes-of-action chemicals and how they interact in mixtures. A key research concern is the possibility that chemicals in mixtures may interact in a non-additive manner. The overall approach will be to identify key biological processes that could be used in testing for various health endpoints and determining effects of chemicals based on their mechanism or mode of action and environmental relevance. Studies focus on dose-response curves for chemicals in isolation and testing for evidence of antagonism, potentiation, or synergism with other chemicals in mixture.

Health effects research on susceptible populations will focus on the influence of genetics and health status on susceptibility to chemical exposures. The principal hypothesis of the research on susceptible sub-populations is that differences among individuals (inter-individual) as well as the variability in an individual's responses over time (intra-individual) are due to biological variability. Information is needed on how various susceptibility factors alter responses to chemical exposures. The overall goal of effects research is to develop improved risk assessment methods for evaluating selected sub-populations.

Susceptible Sub-populations

EPA is committed to developing and verifying innovative methods and models for assessing the susceptibilities of sub-populations to environmental agents and enhancing current risk assessment and risk management strategies and guidance.

The Nation is experiencing a major demographic shift (from young to old) and as the population ages, older Americans may become more susceptible to environmental toxins. Our normal aging process presents unique challenges because our organs and immune system experience a decline in function, and our ability to metabolize or eliminate toxins changes. In FY 2004, in a collaborative effort amongst various EPA Programs Offices, the Agency will launch a National Aging Initiative – led by EPA's Office of Children's Health Protection. EPA's Office of Research and Development will play a critical role in this initiative by identifying and evaluating the unique susceptibilities of the elderly and looking at environmental hazards that affect the health of older persons. Research will also look into how an aging society will impact the environment (e.g., water usage in select regions of the country, issues of disposal associated with antibiotics).

EPA's Children's Health Research Program will continue to play a critical role in shaping how the Agency addresses children's health issues. Much of the effort under the Children's Health Research Program is based on EPA's Strategy for Research on Environmental Risks to Children, which provides direction for research in age-related exposures, physiology, biological responses that may result in increased risks, and risk reduction methods. This research provides the scientific underpinnings that will result in better EPA risk assessments for children and ultimately reduced risks from potential environmental health threats.

As noted above, in FY 2004, a major population-based field study that focuses on children's aggregate exposure to pesticides and other selected toxics in homes, day care centers and schools will continue. This study will provide better understanding of the critical factors influencing very young children's exposures.

The Asthma Research Strategy, released in October 2002, will also play a critical role in meeting EPA's objectives under the human health research program. The Asthma Strategy discusses research efforts aimed at addressing the following issues:

- Susceptibility factors contributing to asthma (e.g., genetics, health status, socioeconomic status, residence and exposure history, and lifestyle and activity patterns);
- Factors contributing to the induction and exacerbation of asthma (e.g., combustion-related products, bioaerosols, and air toxics); and
- Risk assessment and risk management of environmental pollutants relevant to asthma.

Because of the rising rate of asthma in the United States, especially among children, and the scientific uncertainty as to the causes, the Agency will enhance its efforts to address this research need, working within the framework of the Strategy. Specifically, research will examine the toxic effects of aldehydes and bioaerosols on lung function (e.g., irritant responses, altered lung function, and inflammatory endpoints). Information resulting from this effort will be used to study effects of aldehydes and bioaerosols in human asthmatics.

EPA will also enhance its efforts to explore research opportunities to fill critical knowledge gaps for childhood cancer. Potential areas of emphasis include: 1) development and validation of susceptibility biomarkers that can be used to determine the range of susceptibility in a population (and sub-population) most at risk; and 2) study of the linkages between markers of exposure and cellular effects and then the relationship of these to disease outcomes. *In utero* and early life exposures to carcinogens may increase a child's risk of developing cancer before adulthood. The timing of exposures and their cellular and molecular consequences should be carefully considered in research that seeks to understand the relationship between susceptibility factors, environmental exposures and risk of a variety of childhood cancers. The Agency will use a molecular epidemiology approach where markers of exposure, susceptibility and effects can be developed in an integrated manner and related to a specific disease outcome.

In FY 2004, EPA will continue to work on guidance for conducting risk assessments for children. The guidance will address issues such as critical windows of vulnerability, mechanisms of action, use of pharmacokinetic data and models in risk assessments for children, exposure models, recommended age categories for exposure assessment, and child-specific exposure factors. EPA will also complete an updated version of the Child-Specific Exposure Factors Handbook containing new analyses and updated recommendations for assessment.

Additional risk assessment research will develop and test methods for collecting data in the National Children's Study. This research will:

- Develop and test sampling methods for cost-effective measurement of environmental agents in air, water, soil, food and indoor environments;
- Develop and test methods to collect biological samples from and test for effects in infants and children;
- Develop and test questionnaires that elicit information through questions that are accurate surrogates of exposure and effects measurements; and
- Develop methods to identify highly exposed and symptomatic individuals for over-sampling.

Under the Voluntary Children's Chemical Evaluation Program (VCCEP), the Agency will continue to assist vendors and school systems in the manufacture, procurement, and proper use of low-emitting consumer products and building materials to reduce the exposure of children to contaminants that can contribute to asthma and other respiratory problems.

Through the Children's Environmental Research Centers, EPA seeks to better understand the causes of environmentally induced disease among children and to eventually decrease the prevalence of childhood disease. In FY 2004, efforts will focus on working with community participants to assess the impact of reducing pollutants in the home and neighborhood on children's hearing, behavior, and test scores, and assessing the impact to children of exposure to mercury and PCBs among minority populations in Wisconsin, whose diets are heavy in fish from the Great Lakes. Additionally, research to understand the relationship(s) between environmental factors and developmental disorders will continue.

Assessing the State of the Environment

In FY 2004, EPA will initiate research in support of the Agency's annual State of the Environment (SOE) Report. This investment will allow EPA to measure progress in achieving cleaner air, safer water, and better-protected land resources by assessing actual impacts on human health. Focusing on indicators will move EPA beyond its historic reliance on process indicators (e.g., decreased emissions/discharges; increased facilities in compliance) to more direct outcome measures (e.g., reduced human exposures, reduced illness and disease).

EPA will develop the scientific components and aspects of the Report, including targeting the appropriate indicators for development and validation and ensuring the quality of the science and the utility of proposed data sets, designs, and indicators. In FY 2004, a workshop will be held to determine which human health indicators are most appropriate and highest priority for use in supporting the Annual SOE Report. Ultimately, the availability of

such indicators will impact the structure and design of Agency monitoring systems and the tracking efforts of others, and offer alternatives to some of the traditional reporting endpoints with a potential for cost savings.

EPA Science Advisor

In FY 2004, EPA will establish a Science Advisor function. The Science Advisor will be responsible for ensuring the availability and use of the best science to support Agency policies and decisions, as well as advising the EPA Administrator on science and technology issues and their relationship to Agency policies, procedures, and decisions. The Science Advisor's office will require a small cadre of senior staff to promote effective partnerships with EPA Programs and Regions, assist them in their efforts to strengthen environmental science, and provide for timely and open communication on critical science matters.

Homeland Security

Research in the area of rapid risk assessment will inventory internal, government and private sector national expertise to provide quick access to nationally recognized experts in areas relevant to homeland security (e.g., biology, chemistry, exposure assessments, detection/treatment technologies).

In FY 2004, emphasis will be placed on: evaluating methods for decontamination following exposure to biological agents, supporting development of optimal exposure protocols, refining toxicity databases, developing transport, fate, dispersion, and exposure parameters, and creating a rapid response bioinformatics monitoring team. In addition, work will begin on establishing protocols for communicating secondary risks, developing frameworks for sentinel animals to assist with exposure assessments, improving biological technology of assay screening, and improving methods for rapid detection of contaminants. As part of this objective, EPA will organize a support center to provide scientific and technical data and information to public officials at the federal, state, and local levels.

FY 2004 Change from the FY 2003 Request

S&T

- (+\$8,560,600, +6.1 FTE) This increase represents increased support to the Agency's Homeland Security Strategic Plan in the area of rapid risk assessment research. In FY 2004, emphasis will be placed on: evaluating methods for decontamination following exposure to biological agents, supporting development of optimal exposure protocols, refining toxicity databases, developing transport, fate, dispersion, and exposure parameters, and creating a rapid response bioinformatics monitoring team. EPA will also organize a support center to provide scientific and technical data and information to public officials at the federal, State, and local levels.

- (+\$450,000) The Agency will increase its efforts in children's health research with a focus on childhood cancer and asthma. Cancer research will focus on developing and validating biomarkers that can be used to determine susceptibility ranges in children, and studying the linkages between markers of exposure and cellular effects and their relationship to disease outcomes. Activities in the area of asthma research will examine the toxic effects of aldehydes and bioaerosols on lung function.
- (+\$1,160,200, +3.5 FTE) This increase establishes a Science Advisor to the EPA Administrator with resources appearing in Goal 8, Objective 1 and Goal 8, Objective 2. The Science Advisor will be responsible for ensuring the availability and use of the best science to support Agency policies and decisions, as well as advising the Administrator on science and technology issues and their relationship to Agency policies, procedures, and decisions.
- (+\$975,000) In a collaborative Agency-wide effort, the Agency will launch a National Aging Initiative – led by EPA's Office of Children's Health Protection. Research will play a critical role in this initiative by identifying and evaluating the unique susceptibilities of the elderly and looking at environmental hazards that affect the health of older persons. Research will also look into how an aging society will impact the environment (e.g., water usage, issues of disposal associated with antibiotics). This research will enhance the scientific foundation for assessing the health risks to the elderly.
- (+\$910,000) This increase supports EPA's FY 2004 State of the Environment (SOE) Report, which is also being supported under Goal 8, Objective 3. The investment will allow EPA to measure progress in achieving cleaner air, safer water, and better-protected land resources by assessing actual impacts on human health. In FY 2004, a workshop will be held to determine which human health indicators are most appropriate and of the highest priority for use in supporting the Annual SOE Report.
- (+\$500,000) This increase represents a redirection from Pollution Prevention Tools and Technologies to the NCS. These funds will support the design, pilot, and feasibility stage implementation of the NCS. As a member of the NCS Interagency Coordinating Committee (ICC), EPA is taking the lead in developing methods to investigate the relationships between exposure to environmental agents and adverse health outcomes in children.
- (-\$2,608,500) This represents a redirection of Computational Toxicology resources to Goal 8, Objective 3 – where EPA is formally consolidating its program in this area. There are no programmatic impacts.

- (-\$524,200, -5.2 FTE) These workyears are being redirected to support the Agency's Homeland Security Strategic Plan in the areas of rapid risk assessment research and building decontamination research.

EPM

- (+\$693,000, +1.6 FTE) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters' contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. *(Total changes -> rent: +\$1,417,000, utilities: +\$2,374,800, Security: +\$3,425,000 and 75 FTE, Human Resources: +\$870,400 and +5.4 FTE, Contracts: +\$642,400 and -18.5 FTE, Grants: +\$3,015,500 and +19.7 FTE)*

There are additional increases for payroll, cost of living, and enrichment for new and existing FTE.

GOAL: SOUND SCIENCE, IMPROVED UNDERSTANDING OF ENV. RISK AND GREATER INNOVATION TO ADDRESS ENV. PROBLEMS

OBJECTIVE: IMPROVE SCIENTIFIC BASIS TO MANAGE ENVIRONMENTAL HAZARDS AND EXPOSURES.

Annual Performance Goals and Measures

Research

Human Health Risk Assessment Research

In 2004 Contribute to protecting children from harmful environmental agents in their daily lives by providing risk assessors and managers with better data on children's aggregate exposures in their homes and daycare settings, and improved exposure factors for estimating children's risk.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request		
External review draft of an updated Exposure Factors Handbook for Children, incorporating new data from EPA studies			1		review draft
Analysis of the "Children Total Exposure to Pesticides and Persistent Organic Pollutants (including EDCs) Study" to estimate aggregate exposures and identify critical exposure factors.			1		report

Baseline: Current risk assessments for children are severely hampered by a lack of exposure data and by exposure factors that are insufficient for describing how exposures change as children grow up and alter their activities. This research will provide significant new data on children's exposures to a wide range of environmental pollutants as they go about their daily lives, focusing on exposures in their homes and/or in daycare centers. The updated exposure factors will be more reliable, since they will incorporate more complete and better data and approaches to describe children's exposures to environmental pollutants. The data and factors developed in FY 2004 will significantly improve the reliability of the estimates of children's exposure and risk used by regulatory decision-makers throughout EPA.

Homeland Security - Rapid Risk Assessment

In 2004 Provide a database of EPA experts on topics of importance to assessing the health and ecological impacts of actions taken against homeland security that is available to key EPA staff and managers who might be called upon to rapidly assess the impacts of a significant terrorist event.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	1	database
A restricted access database of EPA experts with knowledge, expertise, and experience for use by EPA to rapidly assess health and ecological impacts focused on safe buildings and water security.					

Baseline: The attacks on the Pentagon and World Trade Center, and the subsequent mailing of anthrax-contaminated letters, were unprecedented events in United States history. Other such events could occur in the future, or a totally different type of an attack might be conducted by a terrorist group or individual. The human health and ecological consequences of such events cannot be known before they happen. It is clear, however, that both human health and the environment will be impacted, either directly or as a result of efforts to contain, decontaminate, or dispose of materials from such events. It is essential that information on human health and ecological risks be developed as quickly as possible to help inform the relevant EPA personnel who can then share that information with public officials and the affected individuals. Such assessments must be conducted recognizing that in many instances supporting technical data will be limited. No current database is available that identifies those individuals within EPA that have the knowledge, experience, and expertise to address risk assessment issues such as source characterization, hazard identification, dose-response assessment, exposure assessment, and risk characterization in a short time frame. The database that will be completed in FY 2004 will allow EPA to develop a quick-response capability to future events so that assessments of human health and ecological impacts can be conducted rapidly. The database is being developed in support of EPA's Draft Strategic Plan for Homeland Security and is focused on the rapid risk assessment tactic described in the strategy.

SOE Report - Human Health Indicators Research

In 2004 Develop a prioritized slate of potential human health indicators that improve EPA's ability to measure environmental progress using direct outcome measures (e.g., improvements in human health) and are appropriate for supporting State of the Environment Reports.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	1	workshop report
Produce a workshop report on the state of human health indicators to determine areas in which future research is needed.					

Baseline: In Nov 2001, the EPA Administrator gave direction to gather and develop information to help the EPA determine where we are and where we need to go to make sound strategic decisions regarding human health and environmental conditions. To accomplish this task, a document entitled the State of the Environment Report will be produced, backed by a scientifically-based technical support document. The selection and use of the most appropriate indicators that will be described in the technical support document is dependent on the information gained, exchanged and shared at a workshop specifically designed to assess the current state of knowledge and future needs in the area of human health indicator research.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	1	database
A restricted access database of EPA experts with knowledge, expertise, and experience for use by EPA to rapidly assess health and ecological impacts focused on safe buildings and water security.					

Baseline: The attacks on the Pentagon and World Trade Center, and the subsequent mailing of anthrax-contaminated letters, were unprecedented events in United States history. Other such events could occur in the future, or a totally different type of an attack

might be conducted by a terrorist group or individual. The human health and ecological consequences of such events cannot be known before they happen. It is clear, however, that both human health and the environment will be impacted, either directly or as a result of efforts to contain, decontaminate, or dispose of materials from such events. It is essential that information on human health and ecological risks be developed as quickly as possible to help inform the relevant EPA personnel who can then share that information with public officials and the affected individuals. Such assessments must be conducted recognizing that in many instances supporting technical data will be limited. No current database is available that identifies those individuals within EPA that have the knowledge, experience, and expertise to address risk assessment issues such as source characterization, hazard identification, dose-response assessment, exposure assessment, and risk characterization in a short time frame. The database that will be completed in FY 2004 will allow EPA to develop a quick-response capability to future events so that assessments of human health and ecological impacts can be conducted rapidly. The database is being developed in support of EPA's Draft Strategic Plan for Homeland Security and is focused on the rapid risk assessment tactic described in the strategy.

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Produce a workshop report on the state of human health indicators to determine areas in which future research is needed.			1	workshop report

Baseline: In Nov 2001, the EPA Administrator gave direction to gather and develop information to help the EPA determine where we are and where we need to go to make sound strategic decisions regarding human health and environmental conditions. To accomplish this task, a document entitled the State of the Environment Report will be produced, backed by a scientifically-based technical support document. The selection and use of the most appropriate indicators that will be described in the technical support document is dependent on the information gained, exchanged and shared at a workshop specifically designed to assess the current state of knowledge and future needs in the area of human health indicator research.

Verification and Validation of Performance Measures

FY 2004 Performance Measure: Produce a workshop report on the state of human health indicators to determine where future research is needed.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Report

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

FY 2004 Performance Measure: External review draft of an updated Exposure Factors Handbook for Children, incorporating new data from EPA studies.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Draft report

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

FY 2004 Performance Measure: Analysis of the "Children Total Exposure to Pesticides and Persistent Organic Pollutants (including EDCs) Study" to estimate aggregate exposures and identify critical exposure factors.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Report

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

FY 2004 Performance Measure: Deliver a restricted-access, database of EPA experts with knowledge, expertise, and experience for use by EPA Program Offices and Regions to rapidly assess health and ecological impacts focused on safe buildings and water security.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Database

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

Coordination with Other Federal Agencies

Several Federal agencies sponsor research on variability and susceptibility in risks from exposure to environmental contaminants. The National Institutes of Environmental Health Sciences (NIEHS) achieves its mission through multi-disciplinary biomedical research programs, prevention and intervention efforts, and communication strategies. The NIEHS program includes a National Institutes of Health (NIH – parent organization of NIEHS) effort to study the effects of chemicals, including pesticides and other toxics, on children. EPA has collaborated with NIEHS in establishing Centers for Children’s Environmental Health and Disease Prevention to study whether and how environmental factors play a role in children’s health.

The National Center for Health Statistics (NCHS) of CDC is conducting the National Health and Nutrition Examination Survey (NHANES). NHANES is a national population-based survey and includes data on potentially sensitive sub-populations such as children and the elderly. EPA is participating in this survey with NCHS to collect information on children’s exposure to pesticides and other environmental contaminants.

The National Institute of Child Health and Human Development (NICHD) supports laboratory, clinical, and epidemiological research on the reproductive, neurobiological, developmental, and behavioral processes, that determines the health of children and adults. EPA is collaborating with NICHD, CDC, and other Federal agencies in the design and implementation of a National Children’s Study of 100,000 children, who will be enrolled during the mother’s

pregnancy and followed throughout childhood and adolescence. This study was mandated in the Children's Health Act of 2000 to study environmental influences on children's health and development.

The National Center for Toxicological Research (NCTR) supports fundamental research on the effects of chemicals regulated by the Food and Drug Administration. Although some of the models used by NCTR may be similar to those used by EPA, the chemicals and regulatory context vary significantly. Historically, NCTR has been a leader in developing models and principles for risk assessment, which has led to collaborations between EPA and NCTR scientists.

Statutory Authority

Clean Air Act (CAA)

Safe Drinking Water Act (SDWA)

Clean Water Act (CWA)

Toxics Substances Control Act (TSCA)

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Resources Conservation and Recovery Act (RCRA)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Superfund Amendments Reauthorization Act (SARA)

Food Quality Protection Act (FQPA)

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Enhance Capabilities to Respond to Future Environmental Developments.

Enhance EPA's capabilities to anticipate, understand, and respond to future environmental developments; conduct research in areas that combine human health and ecological considerations; and enhance the Agency's capacity to evaluate the economic costs and benefits and other social impacts of environmental policies.

Resource Summary (Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Enhance Capabilities to Respond to Future Environmental Developments.	\$61,427.7	\$50,965.8	\$68,911.4	\$17,945.6
Environmental Program & Management	\$10,877.7	\$10,008.5	\$11,027.1	\$1,018.6
Science & Technology	\$50,550.0	\$40,957.3	\$57,884.3	\$16,927.0
Total Workyears	169.2	152.6	166.7	14.1

Key Program (Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Congressionally Mandated Projects	\$3,753.8	\$0.0	\$0.0	\$0.0
Endocrine Disruptor Research	\$10,353.1	\$11,806.5	\$11,538.8	(\$267.7)
Facilities Infrastructure and	\$2,267.8	\$2,177.2	\$2,758.3	\$581.1

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Operations				
Homeland Security-Preparedness, Response and Recovery	\$1,587.6	\$0.0	\$0.0	\$0.0
Management Services and Stewardship	\$327.7	\$299.1	\$633.3	\$334.2
Regulatory Development	\$7,552.3	\$7,532.2	\$7,635.5	\$103.3
Research to Support Emerging Issues	\$28,658.5	\$29,150.8	\$41,470.5	\$12,319.7
STAR Fellowships Program	\$9,748.7	\$0.0	\$4,875.0	\$4,875.0

FY 2004 Request

In recent years, EPA has begun moving beyond environmental regulation to environmental protection in its broadest sense, including anticipating and preventing problems before they develop into major concerns. Research to support EPA in this endeavor focuses on EPA's capabilities to anticipate, understand, and respond to future environmental developments, in areas that combine human health and ecological considerations with social science, environmental decision-making, and estimation of environmental costs, risks, and benefits.

For FY 2004, research will continue in the areas of endocrine disruptors, mercury, and socio-economics. EPA will undertake new research efforts in FY 2004 related to computational toxicology, Multi-pollutant initiative research, environmental indicators work in support of the State of the Environment Report and graduate fellowships. Research strategies and Multi-Year Plans articulate the long-term goals, purpose, and priorities. They include a scheduled timeline of research and assessment activities and the expected products including annual performance goals and measures under the Government Performance and Results Act (GPRA).

Endocrine Disruptors

Evidence suggests that humans and animals, both domestic and wildlife species, have suffered adverse health effects resulting from exposure to environmental chemicals that interact with the endocrine system. Collectively, these chemicals are referred to as endocrine disrupting chemicals (EDCs). Reports of reproductive effects in humans over the last four decades, and increases in certain cancers that may have an endocrine-related basis (breast, prostate, testicular), have led to speculation about environmental causes. Recognizing the potential scope of the problem, the possibility of serious health effects on populations, and the persistence of some EDCs in the environment, EPA developed a "Research Plan for Endocrine Disruptors" in 1998 (www.epa.gov/ORD/WebPubs/final/revendocrine.pdf). The EDC Research Plan was externally

peer-reviewed by a panel convened by the Agency's Risk Assessment Forum. The objective of the EDCs research program is to improve knowledge and understanding of endocrine disruptors in the environment in order to improve methods of assessment and risk management. It includes areas that are of unique importance to EPA in helping the Agency meet its legislative mandates and that serve to improve the basic understanding of EDCs in general. EPA has also developed a draft EDC Multi-Year Plan (MYP) that identifies the elements of the EDC Research Plan that EPA will pursue in an integrated fashion over a seven-year time frame.

Endocrine disruptors research in FY 2004 will continue to focus on the priorities established in the 1998 plan by developing tools to identify hazards, characterize the extent of human and wildlife exposures to known and suspected EDCs, and manage risks from exposure to EDCs. This research focuses on three long term goals: 1) provide a better understanding of the science underlying the effects, exposure, assessment, and management of endocrine disruptors; 2) determine the extent of the impact of endocrine disruptors on humans, wildlife, and the environment; and 3) support EPA's screening and testing program mandated under the Food Quality Protection Act of 1996 and the Safe Drinking Water Act Amendments of 1996. In FY 2004, EPA will: identify key risk assessment issues and develop guidance for assessing endocrine disruptors; evaluate existing risk management tools to reduce exposure to EDCs; develop and evaluate an innovative DNA microarray and other state-of-the-art analytical methods for EDCs; evaluate several classes of chemicals suspected of being EDCs and determine their potencies in laboratory studies; initiate collaborative studies with other Federal agencies and academia to characterize the extent of EDC exposures; and ascertain the degree to which certain EDCs adversely affect wildlife at the population level.

As in the past, EDC-related work will be organized along an integrated pathway of effects, exposure, risk assessment, and risk management research. Effects research is needed to determine the nature and extent of adverse effects in humans and wildlife caused by exposure to EDCs. Efforts in this area will focus on: 1) the development and standardization of protocols for the Agency's screening and testing program to identify endocrine disrupting chemicals, 2) determining the unique relationship between developmental exposures (e.g., prenatal and early postnatal) and the onset and severity of adverse health outcomes later in life (adulthood), and 3) determining the degree to which the effects of EDCs can be extrapolated across species.

Exposure research is needed to characterize the key factors contributing to how, when, and where EDC exposures occur and their magnitude. Efforts will focus on: 1) developing analytical and measurement tools (DNA microarrays, etc.) for characterizing and quantifying EDC exposures; 2) conducting pilot studies to validate these methods (collaborating with other ORD labs and the Regions and States); and 3) planning and conducting exposure studies to better define the spatial and temporal variability along with the magnitude of real-world EDC exposures. Assessment work will result in the development of an analytical framework and guidelines for evaluating health and ecological impacts of reported endocrine disruptors. To achieve this, risk assessment research will: 1) identify key risk assessment issues for evaluating endocrine disruptors; 2) identify methods to adequately evaluate data on the effects of EDCs on human health and the environment; 3) develop a framework that supports proper assessment of

EDCs; and 4) develop and document guidance, incorporating this framework, for assessing EDCs.

Risk management research will identify current EDC releases that can be mitigated or eliminated by existing risk management tools and will develop new tools to manage current and future EDC risks. Initial efforts will focus on the following sources of exposure: 1) combustion; 2) confined animal feeding operations; 3) drinking water treatment; 4) contaminated sediments; and 5) waste water treatment.

Computational Toxicology

The emerging sciences of genomics, computational methods and bioinformatics have created a new opportunity to revolutionize the science used in chemical risk assessment. While EPA has long worked toward obtaining the studies needed to reduce, refine and replace test methods, the computational toxicology work under this objective will enable EPA to develop approaches to reduce animal testing to a far greater extent by developing alternative techniques for prioritizing chemicals for further testing. This computational toxicology work is within the Molecular-level Understanding of Life Processes activity, which is one of the Administration's six high-priority science and technology activities for federal investment.

In FY 2004, EPA will produce a peer-reviewed Computational Toxicology Research Strategy describing how EPA will provide the proof-of-concept for several EPA problems involving the testing requirements for endocrine disruptors and a complex class of new pesticides where cumulative risks are a concern. The overall goal of the computational toxicology research program is to develop more efficient approaches to reveal the sequence of events by which aggregate and cumulative exposures to chemicals can cause adverse effects in humans and a large number of natural populations and to incorporate the use of these methods in risk assessments. The proof-of-concept research will demonstrate how computational toxicology can integrate new scientific advances for reducing the cost of EPA regulations. This program will also significantly improve risk assessment by basing risk on the key molecular events underlying adverse effects on human health and the environment.

Mercury

Mercury is released from a variety of sources, exhibits a complicated chemistry, and proceeds via several different pathways to humans and wildlife. After release, mercury undergoes complicated transformations that can result in highly toxic methylmercury, an organic form of mercury which bioaccumulates in fish and animal tissue. Methylmercury is a persistent compound posing risks of neurological and reproductive problems for human and wildlife, and therefore is a pollutant of considerable concern.

Since the developing nervous system is more vulnerable to mercury toxicity, children exposed to methylmercury through their mother's consumption of fish, and children who eat large amounts of fish from local waters, can be particularly at risk of adverse effects. The

presence of mercury in freshwater fish, particularly predator fish higher in the food chain, is the most frequent basis for fish advisories. Predatory marine fish (tuna, swordfish, etc.) is also a source of mercury to humans. Almost 75 percent of all fish advisories in the United States are at least partly due to mercury contamination in fish and shellfish. The number of states that have issued mercury advisories has risen steadily from 27 in 1993 to 44 in 2001. As of May 2002, seventeen states issued statewide advisories for mercury in freshwater lakes and/or rivers.

While power generation facilities collectively are the largest remaining source of mercury emissions to the atmosphere, there are great uncertainties associated with understanding the fate and transport of atmospheric mercury and how to most efficiently manage this pollutant while simultaneously meeting significant reduction targets for other pollutants. The final rule to regulate mercury and other air toxics from power plants is due by December 15, 2004. In addition, the Administration has proposed the Clear Skies Initiative to cut power plant pollution, including mercury, by 70 percent in order to protect public health.

EPA has developed a draft Mercury Multi-Year Plan, which identifies research efforts to be worked on over a six-year time frame, that includes the elements of the Agency's externally peer-reviewed Research Strategy for Mercury (2000). In FY 2004, the Agency's Clear Skies Research Initiative will focus on mercury by collecting data at power plants to evaluate the performance of continuous emission monitors (CEMs) and initiate laboratory studies to improve EPA's understanding of atmospheric mercury fate and transport. This research, which will be conducted to support implementation of the final rule to regulate mercury and other air toxics from power plants, will also support the President's Clear Skies Initiative by identifying where emerging control technologies and continuous measurement of mercury combustion sources can facilitate or optimize mercury emissions reduction.

Major short-term products include the completion of data collection at the power plants to evaluate the long-term performance of continuous emissions monitors (CEMs) and emerging control technology options, and completion of the design of laboratory studies to test and confirm hypotheses of critical atmospheric reactions observed in field studies. For the longer-term, major products will include: 1) state-of-the-art information for a variety of stakeholders (EPA, states, industry) on the cost, performance, and environmental implications of mercury control technologies taking into account the latest field study results; and 2) atmospheric mercury fate and transport and source apportionment models and source emissions to assess how reductions in power plant emissions have influenced atmospheric concentrations.

EPA will emphasize several other mercury-related research issues in FY 2004, including: 1) source characterization and cataloging from non-combustion sources; 2) assessment of key fate and transport issues for tracking the fate of mercury from sources to concentrations in fish tissue; 3) mercury risk communication strategies (especially to sensitive sub-populations); and 4) disposal of excess mercury stocks and improved management of mercury wastes. Research in FY 2004 will reflect a greater emphasis on ecological effects assessment. Research results will include a model provided to the states and regions capable of supporting a Total Maximum Daily Load (TMDL) assessment of methylmercury levels in fish resulting from atmospheric

deposition, point sources, and internal watershed processes. This model will be used to evaluate the relative impacts of local sources, internal cycling, and long-range transport and to predict the responses of mercury concentrations in fish to mitigation measures.

Environmental Indicators

To measure progress in achieving cleaner air, safer water, and better-protected land resources by assessing actual impacts on human and ecological health, new research will provide the foundation for the Agency's Report on the Environment. This focus will move EPA beyond its historic reliance on process indicators (e.g., decreased emissions/discharges; increased facilities in compliance) to more direct outcome measures (e.g., improved ecological conditions, reduced human exposures, reduced illness and disease). Indicator research has played a pivotal role in the formulation and preparation of the first EPA SOE Report. This investment is intended to expand this important contribution with respect to future SOE Reports. In FY 2004, EPA will produce a technical report on the current state of environmental indicators, which will provide the scientific basis for the FY 2004 State of the Environment Report.

Socio-Economic Research

Effective accomplishment of EPA's mission depends on understanding not only the physical and biological effects of environmental changes, but also the behavioral causes and consequences of those changes. The focus of socio-economic research at EPA is to develop a better basis for making decisions using sound assessments of human behavior that affect environmental outcomes. Priority socio-economic research identified by EPA economists and outside experts includes: ecosystem and human health benefits valuation; decision-making processes that incorporate non-monetized benefits; value of information; corporate environmental behavior and the effectiveness of government interventions; and effective group or community decision-making. The implementation strategy is outlined in EPA's draft socio-economic MYP.

Research conducted in FY 2004 will enhance environmental decision-making by improving the understanding of how people value the environment, and will focus on difficult valuation issues of critical concern to environmental decision makers as they evaluate environmental policy initiatives. This research focus is particularly important to regulatory programs that must conduct cost-benefit analyses. Ecosystem valuation is one of the top research priorities for agency rule development because there are extensive gaps in the information we have about biodiversity, habitat, wildlife, and different ecosystem states. Research on market mechanisms and incentives will support investigations that explore the conditions under which financial and other performance incentives will achieve environmental objectives (e.g., pollution reduction, habitat preservation) at a lower cost or more effectively than traditional regulatory approaches. This research will also help Federal and state agencies understand how regulated entities respond to the incentives for environmental compliance offered through enforcement, compliance assistance, and information and voluntary mechanisms.

Graduate Fellowships and Exploratory Grants

A blue ribbon panel of the Science Advisory Board recommended in 1994 that EPA enhance its environmental education programs for training the next generation of scientists and engineers. In FY 1995, the Science To Achieve Results (STAR) graduate fellowship program was initiated to meet that challenge. This competitive, peer-reviewed program is designed to attract some of the brightest and most dedicated students in the Nation for training in scientific and engineering disciplines pertaining to the protection of public health and the environment. The goal of this program is to encourage these students to pursue careers in environmentally-related fields not only with EPA, but also with states, localities, and industry. Research completed under the fellowship program helps resolve uncertainties associated with particular environmental problems and focuses graduate research on priority areas. In FY 2004, the Agency expects to support fellowships across multiple disciplines, including the biological and physical sciences, mathematics, computer sciences, and engineering.

In FY 2004, the Exploratory Grants research program will announce an annual solicitation for research proposals in areas where significant gaps in scientific knowledge and understanding exist. This program provides opportunities for individual investigators from the academic research community to conceive, define, and propose research projects. Topics from a broad variety of areas, such as environmental chemistry and physics, health and ecological effects of pollution, and nanotechnology can be addressed under the Exploratory Grants program. Nanotechnology is one of the Administration's six high-priority science and technology activities for Federal investment. Panels of external researchers competitively review the proposals, with only the most scientifically sound proposals ultimately receiving support. The major program outputs are scientific articles published in peer-reviewed literature; these publications are intended to enhance scientific knowledge and understanding, and to be used as the basis of regulatory support work.

Improve Economic Information and Methods

In FY 2004, one of EPA's priorities is to undertake economic valuation studies that will better quantify human health and ecological benefits from air, water and waste management programs. Working within the Agency, with outside experts and the Office of Management and Budget, EPA will develop guidance for Agency economists on the best methods available to value reduced health risks from lower pollution levels. In addition, in FY 2004 EPA is committed to continuing to improve its ability to quantify ecological benefits from environmental improvements to better support EPA regulatory decisions and policies. EPA will continue to develop guidance on the performance of economic analyses, and conduct peer reviews of major economic reports.

EPA will continue to analyze the environmental impacts from changes in economic markets anticipated to result from new international trade policies and proposals. Executive Order 13141 mandates "careful assessment and consideration of the environmental impacts of trade agreements," which the Agency will continue addressing through ongoing assessments and

written environmental reviews. The Agency will also continue its work to create a state-of-the-art tool for estimating the environmental impacts of changes in economic activity.

The outputs of risk assessments and benefit-cost analyses are important considerations in decision making at EPA. In FY 2004, EPA will continue to evaluate and refine methods for expanding the use of risk assessment information in economic benefit analyses. EPA's economists often present a single point estimate of the benefits and costs, creating a false sense of precision when, in reality, the estimates are extremely uncertain. Therefore, the Agency will continue to develop methods and guidance to improve the Agency's treatment and presentation of uncertainty in its analyses.

EPA's Science Advisory Board will review new research and analytical methods being considered by EPA to assess and manage environmental risks. EPA will convene economic research and policy workshops on strategic priorities for economics at EPA, including: measuring the economic values of reducing human mortality and morbidity risks, applying market-based approaches to environmental management of watersheds, addressing uncertainties in economic analyses, and valuing the benefits of protecting ecological services. Such workshops help disseminate EPA's research needs and encourage exchanges between the policy and research communities.

The Agency will also continue its work to better measure the costs of its regulatory programs through support of the Census Bureau's Pollution Abatement Control and Expenditure (PACE) survey in order to have reliable, recent cost data. This annual survey was funded by the Department of Commerce's Bureau of the Census until approximately five years ago, when it eliminated funding for the survey. EPA started providing the funding last year because the PACE survey provides the core data EPA relies on for quantifying the costs of environmental protection programs.

EPA will also continue its innovative work on environmental health indicators. These indicators are quantifiable measures of trends over time reflecting important environmental exposures or diseases that may be influenced, in part, by the environment. Work in 2004 will involve the development of new indicators for aggregate exposure to air pollutants and drinking water contaminants, biomonitoring of mercury and pesticide exposures, and the linking of environmental data to health outcomes. Additionally, the Agency will continue its groundbreaking work on environmental health indicators for children.

FY 2004 Change from FY 2003 Request

S&T

- (+\$9,119,100, +17.0 FTE) This increase reflects new resources (\$3,907,500) associated with the Computational Toxicology initiative in addition to realigned base resources related to this work (\$3,238,400, 8 FTE from Goal 8, Objectives 2 and 3 and Goal 4 Objective 3) and redirected resources (\$1,973,200, 9 FTE from Goal 8, Objectives 1

through 4 and Goal 3) to support computational toxicology work. This Computational Toxicology work is within the Molecular-level Understanding of Life Processes activity, which is one of the Administration's six high-priority science and technology activities for federal investment. This initiative will enable EPA to demonstrate how to reduce the cost and use of animal testing to a far greater extent by prioritizing data requirements and will provide the proof-of-concept for several EPA problems involving the testing requirements for endocrine disruptors and a complex class of new pesticides where cumulative risks are a concern.

- (+\$4,875,000) This increase reflects funding to restore a portion of the STAR fellowships program. Resources will be used to award fellowships to top graduate students across multiple environmentally related disciplines, including the biological and physical sciences, mathematics, computer sciences, and engineering.
- (+\$2,227,000, +3.0 FTE) This investment to support the Report on the Environment will enable researchers to coordinate the development of data sets, designs, and indicators. Researchers will work closely with an intra-agency work group to implement the Administrator's vision for using indicators and sound science to inform performance-based management within EPA. Work years include one new post-doctoral position and two work years redirected from Goal 2, Objective 2 to support this investment.
- (+\$1,465,000) This investment for the Clear Skies Initiative is needed in FY 2004 to ensure data on emerging control and measurement technologies are available before utility companies make commitments on how they plan to reach the targets for mercury. This work is also needed to ensure the improved information on transport and fate can be incorporated into air quality models in time to be useful to air quality managers.
- (+\$643,900, +5.5 FTE) This increase reflects the realignment and consolidation of resources for EPA's FY 2003 Regulatory Support initiative. These resources enable EPA scientists to be involved earlier and more often in the policy making process, helping to determine both additional research and analyses needed and review the science underpinning the Agency's decisions. The remaining regulatory support resources are distributed across all eight goals, reflecting the multi-media nature and broad scope of regulatory support work.
- (-\$893,600, -8.0 FTE) These resources are related to work years associated with research characterizing the risk of long-term, continual discharge of Pharmaceuticals and Personal Care Products (PPCPs) to water bodies and in determining the need for human health and ecological criteria. A portion of these work years (1.8) will be redirected to Goal 2, Objective 2 to transfer the PPCPs research program to that objective with other water related research. Other work years (3.2) will be redirected to Goal 7 to support chemical assessments work within the Integrated Risk Information System (IRIS) program, and the remaining (3) work years will be redirected to support Biosolids research in Goal 2,

Objective 2. The redirection of work years out of the PPCP program is expected to reduce the number of measurement methods and occurrence data for PPCPs in water.

- (-\$428,600, -4.0 FTE) This represents a realignment of resources within this objective involved in endocrine disruptor compounds (EDCs) related work to support Computational Toxicology. These resources will continue to focus on EDCs under the Computational Toxicology program.
- (-\$400,800, -1.0 FTE) The reduction also reflects one work year redirected to support chemical reassessments work in Goal 7 within the Integrated Risk Information System (IRIS) program. This reduction also reflects a decrease to the EDC research program that will result in delays in completing research products including the development of thyroid biomarkers and biological indicators.
- (-\$81,000, -0.8 FTE) These resources are being redirected to support the new Homeland Security Research Center. This redirection will reduce bench scale research to determine the combustion parameters that influence mercury capture in combustion systems. This reduction is not expected to impact performance commitments.

EPM

- (+\$915,300, +2.7 FTE) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters' contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. *(Total changes -> rent: +\$1,417,000, utilities: +\$2,374,800, Security: +\$3,425,000 and 75 FTE, Human Resources: +\$870,400 and +5.4 FTE, Contracts: +\$642,400 and -18.5 FTE, Grants: +\$3,015,500 and +19.7 FTE)*

There are additional increases for payroll, cost of living, and enrichment for new and existing FTE.

GOAL: SOUND SCIENCE, IMPROVED UNDERSTANDING OF ENV. RISK AND GREATER INNOVATION TO ADDRESS ENV. PROBLEMS

OBJECTIVE: ENHANCE CAPABILITIES TO RESPOND TO FUTURE ENVIRONMENTAL DEVELOPMENTS.

Annual Performance Goals and Measures

Research

Research to Support the SOE Report

In 2004 Produce a technical report assessing the condition of environmental resources and human health, providing the scientific foundation for a State of the Environment Report and information on areas requiring further scientific data to make sound decisions on protecting human and environmental health.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	
Produce a technical report on the state of environmental indicators, from which the SOE technical chapters will be developed.				1 tech report

Baseline: In Nov 2001, the EPA Administrator gave direction to gather and develop information to help the EPA determine where we are and where we need to go to make sound strategic decisions regarding human health and environmental conditions. To accomplish this task, a document entitled the State of the Environment Report will be produced, backed by a scientifically-based technical support document. This technical support document will incorporate baseline data and will track changes in air and water quality, food and drinking water safety, waste management and recycling, in addition to tracking national public health and environmental conditions and trends.

Computational Toxicology

In 2004 Develop a computational toxicology research strategy that provides the framework for research that will help fill major data gaps for a large number of chemical testing programs and reduce the cost and use of animal testing.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	
Produce a computational toxicology research strategy.				1 strategy

Baseline: The objective of the Computational Toxicology Initiative is to integrate modern computing and information technology with molecular biology to improve the Agency's prioritization of data requirements and risk assessment of chemicals. The ultimate goal of computational toxicology research is to demonstrate the feasibility of setting mechanistically-based priorities for chemical risk assessment and to optimize in vivo and in vitro testing requirements through the use of computational methods and molecular profiling afforded by the advances in emerging technologies such as proteomics and genomics. The Computational Toxicology Initiative will require the development of a research strategy to outline research priorities and themes that EPA should pursue over the next 5-10 years. In FY 2004, EPA will produce a research strategy that identifies major research gaps and approaches for the development of EPA's computational toxicology research. The Computational Toxicology Initiative started in FY2003 and involves research to evaluate key assumptions in the approach using endocrine-disrupting chemicals. Based on principles derived from these studies, the scope of the initiative will be widened to include other chemical classes starting in FY 2004.

Verification and Validation of Performance Measures

FY 2004 Performance Measure: Produce a technical report on the state of environmental indicators from which the SOE technical chapters will be developed.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Technical report

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

FY 2004 Performance Measure: Produce a computational toxicology research strategy.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures: N/A

Data Quality Reviews : Strategy

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

Coordination with Other Agencies

The broad nature of the EDCs issue necessitates a coordinated effort on both the national and international levels. EPA has shown extensive leadership at both levels - chairing the Committee on Environment and Natural Resources (CENR) interagency working group and chairing a Steering Group on Endocrine Disruptors under the auspices of the International Programme on Chemical Safety/World Health Organization for Economic Cooperation and Development (IPCS/WHO/OECD). Due to the complex nature of the uncertainties posed by endocrine disrupting chemicals, the overlapping concerns of Federal agencies, and the resource constraints on the Federal budget, close coordination and cooperation among Federal agencies are essential to the resolution of critical research questions. While the CENR provides the umbrella for this coordination, individual agencies are responsible for the development of their own independent research plans.

EPA is also conducting aggressive outreach efforts with other Federal Agencies in an effort to build collaborative partnerships for the Computational Toxicology Research Program; discussions are currently underway with the National Institute of Environmental and Health Sciences (NIEHS) and the American Chemistry Council. Additionally, research coordination efforts with the Department of Defense (DOD) and the Department of Energy's (DOE) Sandia National Laboratory are also planned.

Under EPA's leadership, an inventory of Federal research on endocrine disruption has been developed and is used to evaluate Federal efforts, identify research gaps and establish priorities, and clarify governmental roles and responsibilities. Working with other nations, EPA has expanded the U.S. Federal inventory to include projects from Canada, Japan, and Europe and has turned it into a Global Endocrine Disruptors Research Inventory with close to 800 projects. The IPCS/WHO/OECD Steering Group on Endocrine Disruptors has developed a "Global State-of-the-Science Review," which was made available August 12th, 2002. Both the inventory and the international assessment result from recommendations made at the 1997 G-8 Environmental Ministers' Meeting. In FY 2004, EPA will continue to collaborate with European countries under the U.S.-EU Science and Technology Agreement and with Japanese scientists under the U.S.-Japan Science and Technology Agreement.

EPA is in a unique position to focus Federal pollution prevention efforts in the critical area of mercury research. Progress has been made in organizing the concepts and ideals of pollution prevention in the private sector, but much work remains. The Agency, through partnerships with private sector companies, non-profits, other Federal agencies, universities, and states, including California EPA, has worked to identify and control human exposure to methylmercury. EPA has also been working with the Department of Energy and the U.S. Geological Survey to address risk management issues associated with mercury emissions from utilities.

EPA will continue to support jointly sponsored economic workshops with other regulatory agencies, such as the Food and Drug Administration and Department of Agriculture, to address the economic valuation of human health effects. These workshops on economics and environmental policy will continue to draw upon EPA-sponsored economic research, facilitating information exchanges among academic and Federal regulatory agency representatives.

The Agency will continue to support jointly sponsored economic workshops with other regulatory agencies, such as efforts under way with the Office of Management and Budget and the Department of Health and Human Services to address valuation of human health effects. Additionally, the Agency will continue to support the Census Bureau's Pollution Abatement Control and Expenditure (PACE) survey in order to have reliable, recent cost data.

Statutory Authorities

Clean Air Act (CAA) and amendments

Environmental Research, Development and Demonstration Act (ERDDA)

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Toxic Substances Control Act (TSCA)

Food Quality Protection Act (FQPA) of 1996

Safe Drinking Water Act (SDWA) and amendments

Toxic Substances Control Act, sections 4, 5, and 6 (15 U.S.C. 2603, 2604, and 2605)

Clean Water Act sections 304 and 308 (33 U.S.C. 1312, 1314, 1318, 1329-1330, 1443)

Safe Drinking Water Act section 1412 (42 U.S.C. 210, 300g-1)

Resource Conservation and Recovery Act/HSWA: (33 U.S.C. 40(IV)(2761), 42 U.S.C. 82(VIII)(6981-6983))

Clean Air Act: 42 U.S.C. 85(I)(A)(7403, 7412, 7429, 7545, 7612)

Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 103(III)(9651)

Pollution Prevention Act (42 U.S.C. 13101-13109)

Federal Technology Transfer Act

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Improve Environmental Systems Management.

Provide tools and technologies to improve environmental systems management while continuing to prevent and control pollution and reduce human health and ecological risks originating from multiple economic sectors.

Resource Summary
(Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Improve Environmental Systems Management.	\$54,429.8	\$52,274.1	\$45,446.9	(\$6,827.2)
Environmental Program & Management	\$5,418.2	\$2,706.1	\$3,270.6	\$564.5
Hazardous Substance Superfund	\$419.5	\$2,468.0	\$743.0	(\$1,725.0)
Science & Technology	\$48,592.1	\$47,100.0	\$41,433.3	(\$5,666.7)
Total Workyears	145.1	146.6	143.0	-3.6

Key Program
(Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Congressionally Mandated Projects	\$13,512.1	\$0.0	\$0.0	\$0.0
Environmental Technology Verification (ETV)	\$3,607.7	\$3,617.6	\$3,682.0	\$64.4
Facilities Infrastructure and	\$2,290.0	\$2,084.0	\$2,352.3	\$268.3

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Operations				
Homeland Security-Preparedness, Response and Recovery	\$40.4	\$1,875.0	\$625.0	(\$1,250.0)
Legal Services	\$251.9	\$270.7	\$282.2	\$11.5
Management Services and Stewardship	\$382.0	\$351.4	\$636.1	\$284.7
Research to Support Pollution Prevention	\$37,672.9	\$44,075.4	\$37,869.3	(\$6,206.1)

FY 2004 Request

EPA has developed and evaluated tools and technologies to monitor, prevent, control, and clean-up pollution throughout its history. The emphasis of the Agency's programs in the 1970's and 1980's was to identify viable options for controlling or remediating environmental problems. Over the last decade, the Agency has turned its attention more and more to pollution prevention (P2) when addressing high-risk human health and the environmental problems. A preventive approach requires: (1) innovative design and production techniques that minimize or eliminate environmental liabilities; (2) holistic approaches to utilizing air, water and land resources; and (3) fundamental changes in the creation of goods and services and their delivery to consumers. The authorizing legislation for this research comes from the Pollution Prevention Act of 1990 that reads in part "The EPA should coordinate with appropriate offices to promote source reduction practices in other Federal agencies, and generic research and development on techniques and processes which have broad applicability."

The purpose, goals and associated research directions for EPA's research program on pollution prevention and new technologies (P2NT) are found in EPA's externally peer-reviewed Pollution Prevention Research Strategy (1998). The draft P2NT Multi-Year Plan (MYP) serves to translate the strategic directions of the Pollution Prevention Research Strategy into a year-by-year plan with specific goals and measures. In FY 2000, in cooperation with EPA's Office of Research and Development, the EPA's Office of Inspector General (OIG) conducted a pilot-scale program evaluation of research within this objective. The OIG evaluation noted EPA had made significant progress in its Government Performance and Results Act (GPRA) efforts. The evaluation has been used to further improve EPA's P2NT research program.

Pollution Prevention and New Technologies

In FY 2004, the Agency will continue to move from one-dimensional solutions involving a single medium/single pollutant to an integrated, systems-based approach stressing

sustainability. EPA will accomplish its holistic approach to P2NT through research on pollution prevention tools and technologies, environmental systems management, the National Environmental Technology Competition and the Environmental Technology Verification (ETV) program. Pollution prevention research in FY 2004 will: (1) provide methods and models for management and prevention of source-specific emissions that threaten public health and ecological systems; (2) develop more flexible and useful lifecycle assessment methods; (3) incorporate lifecycle and cost engineering concepts into industrial process simulators; (4) improve the ability to measure and objectively evaluate the environmental and human health impacts of risk management options; and (5) advance impact assessment theories, methodologies, and tools, including the capability to address such non-chemical impacts as resource depletion, habitat alteration, and decreased biodiversity. This research will also accelerate the adoption and incorporation of pollution prevention by developing, testing, and demonstrating technologies and approaches applicable across economic sectors. In a broader context, pollution prevention tools and technologies research will continue expanding beyond its traditional focus on industrial sectors to other sectors (e.g., energy, agriculture) and ecosystems.

Green chemistry involves the design of chemicals and alternative chemical syntheses that do not use toxic feedstock, reagents, or solvents, and do not produce toxic by-products or co-products. Green chemistry research will contribute to the development of safer commercial substances and environmentally friendly chemical syntheses. This type of research is conducted in partnership with the National Science Foundation (NSF) through EPA's Technology for a Sustainable Environment (TSE) program, which supports the development of cutting-edge P2 technologies based on research in chemistry, chemical engineering, industrial ecology, and manufacturing methods. Academic research in green chemistry research is conducted through EPA's Science to Achieve Results (STAR) program. Proposals for green chemistry research are chosen through a highly selective, peer-reviewed, competitive process. Research efforts will explore benign chemical synthesis, reformulation of products, substitution of alternative chemicals (solvent replacement), bioengineering; and in-process changes in order to reduce harmful emissions of volatile organic compounds (VOCs), global warming compounds, and persistent bioaccumulative toxics (PBTs).

The Agency will continue to support prevention, minimization, and, when possible, elimination of PBTs by improving methods for their identification and testing. These pollutants pose risks because they are toxic, persist in ecosystems, and accumulate in fish and up the food chain. EPA has committed, as outlined in the Agency's Multimedia Strategy for Persistent Bioaccumulative and Toxic (PBT) Chemicals, to create a coordinated, Agency-wide system that will address the multimedia issues associated with priority PBT pollutants. This research is necessary because conventional pollution control techniques will not provide a long-term, sustainable solution. PBTs must eventually be eliminated at their source through process changes or chemical substitution in products. Research will focus on the following areas: (1) dioxins/furans and polychlorinated biphenyls (PCBs); (2) persistent organic pollutants; (3) mercury – from source characterization to retirement of mercury stocks; and (4) the development of a national routine PBT monitoring strategy. By concentrating on these areas, EPA will advance the understanding of exposure, assessment, and management of PBTs while

simultaneously working toward PBT prevention. EPA measures progress on actions under the Agency's multimedia strategy through environmental and human health indicators (e.g., reduced levels of PBTs in human blood or fish tissue), chemical release, waste generation, use indicators and other measures.

Environmental Systems Management

Environmental systems management (ESM) research endeavors to integrate environmental management with economic development and social equity, while simultaneously expanding environmental stewardship by industries, governments, and citizens. The ESM program plan was the subject of a consultation by the Environmental Engineering Committee of the EPA Science Advisory Board (SAB) in March 2001. While a formal report was not required or issued for such a consultation, the Committee unanimously supported the overall direction and goal of the research program. FY 2004 research in this area will focus on obtaining preliminary results from applying market based incentives and principles of law to managing wet-weather flows; field data and land use models; and applying methods for evaluating conventional crops for sustainable agriculture and chemical production technologies.

National Environmental Technology Competition

EPA will also facilitate the adoption of innovative environmental technologies by the public and private sectors through the third component of this objective, the National Environmental Technology Competition (NETC). In FY 2004, EPA will develop competitive solicitations for cost-effective technologies to help small communities meet the new arsenic drinking water standard. Technologies meeting certain criteria will be verified for performance and an external peer review panel will select the most-promising technologies. This competitive process is expected to show tangible, measurable results for developing cost-effective solutions for arsenic removal from drinking water and other such vexing problems.

Small Business Innovation Research Program

EPA's Small Business Innovation Research (SBIR) Program, created by the Small Business Innovation Development Act of 1982 and funded through a 2.5% set-aside of the Agency's extramural research and development budget, makes awards to small, high-tech firms to help develop and move new environmental tools and technologies from "proof of concept" to commercialization. Proposals are evaluated and judged on a competitive basis by external peer reviewers. The SBIR program targets research to prevent pollution, reduce water and air pollution, manage solid and hazardous wastes, and improve environmental monitoring. Recognizing that the expense of carrying out research and development programs is often beyond the means of small businesses, SBIR participants receive both financial and technical assistance in developing and commercializing technologies according to the anticipated market. The technologies developed under SBIR help the regulated community meet environmental

requirements in a more cost-effective manner; enable industry to reduce the use of toxic and hazardous materials in production processes, and in recovering and recycling materials for reuse; and provide new approaches to designing more environmentally-friendly products.

Environmental Technology Verification

Technology purchasers and venture capitalists have historically viewed technology vendor-supplied performance data with skepticism. This has limited the commercial development and use of more innovative technologies. The ETV program provides government management to ensure scientific relevance, fairness, and consistency in evaluating environmental technologies. ETV is a voluntary, market-based verification program for commercial-ready technologies, with over 1,800 stakeholders who represent diverse interests within the environmental arena. The goal of ETV is to verify the performance characteristics of private-sector-developed technologies so that purchasers, users, and permit writers have the information they need to make environmentally sound decisions. The program is designed so that, as the value of ETV verification becomes more broadly appreciated, technology developers will be required to cover an increasing share of the verification costs. The program cost share for vendors in the program is projected to increase from approximately 17 percent in FY 2001 to approximately 25 percent of program costs by FY 2004. The ETV program has been reviewed twice by EPA's SAB since its inception in 1995. During the second review, the SAB concluded with this remark: "The scarcity of independent and credible technology verification information is one critical barrier to the use of innovative environmental technologies. Therefore, the verification testing information that is provided by the ETV program fulfills an essential need of the environmental technology marketplace."

By the end of FY 2004, the ETV program will have verified over 260 technologies since program inception. It will have also developed over 70 generic testing protocols for the entire research and testing community, and will have data on their performance available for public use. Technology verifications during FY 2004 will focus on advanced monitoring; air pollution control; greenhouse gas abatement; drinking water systems; and water protection. EPA will continue to enhance program outreach efforts through the ETV website, national conferences and workshops, and state permit writer training. ETV is also providing technology verifications during FY 2002 in water security and building decontamination as part of EPA's Homeland Security efforts.

Homeland Security

Research in the areas of water security and rapid risk assessment will support the award of contracts to small business with technologies that advance the Agency's homeland security research program, via the Small Business Innovation Research (SBIR) program. Emphasis will be placed on: developing and testing technologies to detect, contain, decontaminate, and dispose of chemical and biological contaminants as well as developing practices and procedures that

provide rapid risk assessment protocols for chemical and biological agents. Current ETV project managers will shift a portion of their time away from existing ETV programs to focus more attention on the ETV component of the Building Homeland Security program.

FY 2004 Change from FY 2003 Request

S&T

- (+\$487,500) This increase relates to resources set aside for the Small Business Innovation Research (SBIR) Program. This includes the S&T appropriation portion of the \$25,000,000 Homeland Security resources in FY 2004.
- (-\$6,700,000) This decrease represents a partial reduction to funding for the National Environmental Technology Competition (NETC) program. The remaining funds will be used to solicit and award technologies for arsenic removal in drinking water. These technologies will be aimed at assisting small community water suppliers meet the new arsenic drinking water standard by FY 2006.
- (-\$917,700, -4.6 FTE) This reduction represents resources redirected to support the new Homeland Security Research Center. Research efforts within the Environmental Technology Verification (ETV) program will be shifted away from evaluating new technologies to prevent emissions from indoor sources and greenhouse gases toward addressing disposal issues associated with building materials contaminated by biological or chemical agents.
- (-\$400,000) This reduction affects the Technology for Sustainable Environment (TSE) program conducted in partnership with NSF. Specifically, research to develop and communicate risk-based design tools for industrial processes using the industrial ecology concept will be delayed. These resources will be redirected to Goal 8 Objective 2 to support the National Children's Study.
- (-\$223,200, -2.0 FTE) This reduction represents resources redirected to support Computational Toxicology work under Goal 8 Objective 3. This redirection from pollution prevention research will result in delays to ongoing research into innovative life cycle analysis and impact assessment tools used by decision makers evaluating alternative products and processes. This redirection is not expected to impact performance commitments in FY 2004.

Superfund

- (-\$1,725,000) This reduction for SBIR in the Superfund appropriation reflects the reduced resources for Homeland Security in the FY 2004 President's Budget.

EPM

- (+\$553,000, +2.3 FTE) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters' contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. (Total changes -> rent: +\$1,417,000, utilities: +\$2,374,800, Security: +\$3,425,000 and 75 FTE, Human Resources: +\$870,400 and +5.4 FTE, Contracts: +\$642,400 and -18.5 FTE, Grants: +\$3,015,500 and +19.7 FTE)

There are additional increases for payroll, cost of living, and enrichment for new and existing FTE.

GOAL: SOUND SCIENCE, IMPROVED UNDERSTANDING OF ENV. RISK AND GREATER INNOVATION TO ADDRESS ENV. PROBLEMS

OBJECTIVE: IMPROVE ENVIRONMENTAL SYSTEMS MANAGEMENT.

Annual Performance Goals and Measures

Research

New Technologies

- In 2004 Verify 35 air, water, greenhouse gas, and monitoring technologies so that States, technology purchasers, and the public will have highly credible data and performance analyses on which to make technology selection decisions.
- In 2003 Develop 10 testing protocols and complete 40 technology verifications for a cumulative Environmental Technology Verification (ETV) program total of 230 to aid industry, states, and consumers in choosing effective technologies to protect the public and environment from high risk pollutants.
- In 2002 EPA formalized generic testing protocols for technology performance verification, and provided additional performance verifications of pollution prevention, control and monitoring technologies in all environmental media.

Performance Measures:	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	
Complete 20 stakeholder approved and peer-reviewed test protocols in all environmental technology categories under ETV, and provide them to testing organizations world-wide.	20			protocols
Verify and provide information to States, technology purchasers, and the public on 40 air, water, pollution prevention and monitoring technologies for an ETV programmatic total of 230 verifications.		40		verifications
Complete an additional 10 stakeholder approved and peer-reviewed test protocols in all environmental technology categories under ETV, and provide them to international testing organizations.		10		protocols
Through the ETV program, verify the performance of 35 commercial-ready environmental technologies.			35	verifications

Baseline: Actual environmental risk reduction is directly related to performance and effectiveness of environmental technologies purchased and used. Private sector technology developers produce almost all the new technologies purchased in the US and around the world. Purchasers and permittees of environmental technologies need an independent, objective, high quality source of performance information in order to make more informed decisions; and vendors with innovative, improved, faster and cheaper environmental technologies need a reliable source of independent evaluation to be able to penetrate the environmental technology market. In FY 2004, the Environmental Technology Verification (ETV) program will verify 35 additional technologies for a programmatic total of over 250 verifications, making data on their pending performance available for public use as well.

Verification and Validation of Performance Measures

FY 2004 Performance Measure: Through the Environmental Technology Verification (ETV) program, verify the performance of 35 commercial-ready environmental technologies.

Performance Database: Program output; no internal tracking system

Data Source: N/A

Methods, Assumptions and Suitability: N/A

QA/QC Procedures:

Verifications consist of the following steps:

- 1) based on generic verification protocols if available, the specific test/QA plan for each product is developed and agreed to by EPA, the testing partner, and the vendors;
- 2) the product is tested using the procedures outlined in the test/QA plan;
- 3) audits of the test event are conducted by EPA and the partners, and rigorous QA evaluations of the resulting test data are performed;
- 4) after testing and analysis, the partner drafts the verification statements and reports which are reviewed by EPA, the participating vendors, and peer reviewers; and
- 5) after addressing review comments and receiving approval from EPA management, EPA and the partner sign the verification statements.

Data Quality Reviews : Verifications

Data Limitations : N/A

Error Estimate: N/A

New/Improved Data or Systems : N/A

References: N/A

Coordination with Other Agencies

In partnership with the National Science Foundation (NSF), EPA's Technology for a Sustainable Environment (TSE) program supports the development of cutting-edge pollution prevention technology through chemistry, chemical engineering, industrial ecology, and manufacturing. The EPA/NSF partnership in TSE is entering its seventh year of supporting research to prevent pollution at its source. Under the Persistent Bioaccumulative Toxics (PBT) program, EPA has been working with the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), and the Centers for Disease Control and Prevention (CDC) to develop a national routine PBT monitoring strategy. Through the integration of existing monitoring programs, this new strategy will ultimately meet the mutual monitoring objectives of EPA and other Federal agencies.

EPA has contributed projects to the Department of Defense's (DOD's) Strategic Environmental Research and Development Program (SERDP), with particular emphasis on the pollution prevention pillar and the use of lifecycle thinking in addressing the production and manufacture of weapons and military hardware. Preliminary contacts have been made with the Department of Agriculture (USDA) regarding lifecycle analysis and a preventive approach for the development and advancement of biologically and genetically-altered products. Additionally, EPA and DOD's U.S. Army Corps of Engineers will continue addressing the costs and benefits associated with the implementation of new engineering projects and technologies in order to understand and respond to the economic impacts of environmental innovation.

With respect to the Environmental Technology Verification (ETV) program, EPA has co-funded efforts to verify the performance of site characterization and monitoring devices with the Department of Energy's (DOE) Sandia and Oak Ridge National Laboratories. EPA signed a Memorandum of Agreement with DOD to verify jointly environmental technologies that are of mutual interest to EPA and DOD's Environmental Science and Technology Evaluation program. In June 2001, the U.S. Coast Guard (USCG) and EPA signed a Memorandum of Agreement to verify jointly the performance of innovative environmental technologies to control ballast water discharges that may contain invasive species and that have had significant and adverse economical and ecological impacts.

Statutory Authorities

Clean Air Act

Safe Drinking Water Act

Clean Water Act

Toxic Substances Control Act

Federal Insecticide, Fungicide, and Rodenticide Act

Resource Conservation and Recovery Act

Superfund Amendments Reauthorization Act

Clean Air Act Amendments of 1990

Pollution Prevention Act of 1990

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Quantify Environmental Results of Partnership Approaches.

Increase partnership-based projects with counties, cities, states, tribes, resource conservation districts, and/or bioregions, bringing together needed external and internal stakeholders, and quantify the tangible and sustainable environmental results of integrated, holistic, partnership approaches.

Resource Summary (Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Quantify Environmental Results of Partnership Approaches.	\$9,276.2	\$9,058.4	\$9,036.8	(\$21.6)
Environmental Program & Management	\$9,276.2	\$9,058.4	\$9,036.8	(\$21.6)
Total Workyears	20.6	18.0	16.6	-1.4

Key Program (Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Congressionally Mandated Projects	\$700.0	\$0.0	\$0.0	\$0.0
Facilities Infrastructure and Operations	\$215.6	\$241.9	\$222.6	(\$19.3)
Legal Services	\$47.3	\$53.3	\$55.4	\$2.1
Management Services and Stewardship	\$100.6	\$112.1	\$3.1	(\$109.0)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Regional Geographic Program	\$7,609.2	\$8,651.1	\$8,755.7	\$104.6

FY 2004 Request

The Regional Geographic Initiative Program (RGI) is an effective tool that the Agency's Regional offices use to achieve a balance between flexibility in responding to state and local needs while adhering to national priorities. The issues addressed by this program are often multi-media in nature and showcase innovative solutions. Many RGI projects are critical components of larger Agency programs and the Regions use RGI to further such initiatives as children's health, watersheds, clear skies, and environmental stewardship.

The value returned by projects funded through the RGI Program are:

- increased flexibility to respond to strategic regional, state, and local priorities outside traditional EPA program boundaries;
- additional "leveraged" funds from states, localities, non-profit, private, and other sources that contribute to environmental improvement;
- enhanced innovation;
- holistic, multi-media and/or cross programmatic approaches to solving environmental programs;
- increased focus on environmental outcomes, rather than activity measures; and
- added stakeholder involvement and participation in project development and implementation.

In FY 2002, the environmental projects supported by the RGI Program received an average of \$14 from our environmental partners for every \$1 received from the RGI program. This 14-to-1 ratio is a noteworthy level of leveraging that emphasizes the environmental benefits of forming partnerships to implement the projects funded by this program.

Working with communities to find cost effective solutions that work for them, ensuring involvement of all stakeholders in the process, and leveraging resources from federal, state and private sectors are all critical components of the RGI program. The success of the RGI approach in resolving environmental and health issues supports Agency priorities as we continue to move beyond single-media approaches. In addition, the RGI program provides an essential tool for the

regions in the continuing evolution of their role as program implementers with a focus on finding innovative solutions to complex environmental problems.

FY 2004 Change from FY 2003 Request

EPM

- (-\$128,300, -1.4 FTE) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters' contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. *(Total changes -> rent: +\$1,417,000, utilities: +\$2,374,800, Security: +\$3,425,000 and 75 FTE, Human Resources: +\$870,400 and +5.4 FTE, Contracts: +\$642,400 and -18.5 FTE, Grants: +\$3,015,500 and +19.7 FTE)*

There are increases for payroll, cost of living and enrichment for new and existing FTE.

Statutory Authorities

Multi-Media

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Incorporate Innovative Approaches.

Incorporate innovative approaches to environmental management into EPA programs, so that EPA and external partners achieve greater and more cost-effective public health and environmental protection.

Resource Summary (Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Incorporate Innovative Approaches.	\$26,070.7	\$29,787.9	\$31,939.0	\$2,151.1
Environmental Program & Management	\$25,720.7	\$29,787.9	\$31,939.0	\$2,151.1
Science & Technology	\$350.0	\$0.0	\$0.0	\$0.0
Total Workyears	112.9	126.7	127.4	0.7

Key Program (Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Common Sense Initiative	\$1,838.7	\$0.0	\$0.0	\$0.0
Congressionally Mandated Projects	\$1,000.0	\$0.0	\$0.0	\$0.0
Facilities Infrastructure and Operations	\$1,784.4	\$1,821.7	\$2,143.8	\$322.1
Legal Services	\$380.3	\$409.3	\$427.1	\$17.8

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Management Services and Stewardship	\$186.1	\$168.7	\$244.0	\$75.3
Performance Track	\$1,834.6	\$1,834.6	\$1,834.6	\$0.0
Regulatory Development	\$13,251.3	\$22,429.6	\$24,140.8	\$1,711.2
Small Business Ombudsman	\$3,049.1	\$3,124.0	\$3,148.7	\$24.7

FY 2004 Request

The Agency will continue critical effort to improve the Agency's regulatory and policy development process. In 2004, the Agency will strengthen the policy analysis of key regulatory and non-regulatory actions, improve the economic analysis underlying Agency actions, and enhance the regulatory and policy action information management system. The multimedia analysis will include policy option analysis, regulatory analysis, and analysis of innovative policy approaches. Work will also be directed at strengthening accountability to stakeholders by improving the quality and availability of regulatory data to stakeholders.

In 2004, EPA will continue to ensure that better information is available to Agency decision-makers, including consideration of a broader set of policy options for priority regulations and policy development activities. Particular areas of concentration will be on ensuring appropriate management attention throughout the development process, appropriate cross-office participation in priority rule makings, and better analytic research (e.g., economic, policy, science and legal) planning. EPA will conduct cross-media and strategic policy analysis on crosscutting policy areas to identify more cost-effective and innovative approaches. In addition, the Agency will concentrate on identifying alternatives that improve the environment with the least disruption or cost to the economy. EPA will improve management accountability related to regulation and policy development by incorporating performance measures into its regulatory and policy development tracking system.

Another priority will be to implement the commitments and address the focus areas included in the elements of the Agency's Innovation Strategy, a broad-based, Agency-wide strategy for achieving better results from environmental programs at less cost. Specifically, work in 2004 will include further integrating State innovation efforts; developing new tools and approaches; adapting the culture and management systems to foster innovation; and focusing on measuring and evaluating results and moving successful innovations into broader application in policies and regulations.

In support of the Innovations Strategy, EPA is establishing a competitive grant assistance program that will support state innovation projects. This program is a major effort to direct

innovation toward solving critical environmental problems and to develop a compelling set of innovative management and technological tools. This competitive grant assistance program will focus on strategic goals, identified through a collegial process involving states and EPA's regional offices, and designed to target specific problems that are inhibiting states from achieving superior environmental results. The program will leverage state funds as a criterion for grant selection.

In support of developing new tools and approaches, EPA will pursue assistance programs and promote stewardship and independent environmental responsibility in sectors, facilities, and communities. In the course of this work, the Agency will continue to work closely with states, tribes, and local governments, and will pay particular attention to the needs of small- and medium-sized businesses.

The Innovations Strategy also charges EPA to adapt its culture and management processes to foster innovation. EPA will invest in developing a more structured system of organizational learning to gain the maximum benefit from innovative efforts. EPA is continuing to explore changes in organizational systems that may address ingrained, cultural resistance to innovation. Such changes may run the gamut from strengthening public involvement in Agency decision-making, to finding creative ways of directing resources to support entrepreneurial, innovative initiatives, to recognizing and rewarding innovators across the Agency.

The Innovations Strategy highlights the importance of effecting a system change so as to make full use of innovations that have been tested and found promising. Such system change may take the form of improvements in specific regulatory programs (potentially impacting the results and outcomes planned in most of the Agency's goals). It may also involve more ambitious changes from current approaches: for example, promoting the use of a sector-based, multi-media approach for addressing small sources based on the Massachusetts Environmental Results Program.

A newly invigorated sectors strategies program will promote enhanced environmental performance in a broad array of high-priority industries. The Agency will complement current EPA activities by using holistic, cross-media approaches for each industry sector. The sector-based approach will enable EPA to tailor efforts to the particular characteristics and needs of each sector and craft innovative approaches to solve environmental problems. In 2004, EPA will continue to work with its state co-regulators to encourage industry development of environmental management systems and initiate other projects to foster continuous improvement in environmental performance. EPA will address major innovation and performance barriers with specific industries. The Agency will use sector programs to bridge the gap between innovative pilots and mainstream program change, as well as build consideration of sector-specific solutions into the development of regulations and policy/guidance documents. The Agency will then disseminate recommended tools and services through SectorStar.

In the process of developing sector approaches, EPA will continue to add to the set of tools it uses to effectively and efficiently deliver environmental quality, promote pollution

prevention, and increase risk reduction. EPA will continue to rely on compliance assurance, voluntary programs, stakeholder involvement, and new sector-based approaches to ensure quicker, more reliable, and more effective results than those attained solely through the traditional tools of standard setting, permitting and enforcement. In support of these strategies, EPA will continue to implement projects that offer flexibility or other benefits to test innovative approaches to environmental protection.

EPA is receiving a large and growing number of requests from states, local governments, the private sector, and non-governmental organizations for assistance in addressing the environmental issues associated with growth and development. The Agency will continue to help state and local governments, as well as communities, achieve their environmental goals using smart growth approaches. Smart growth approaches will be integrated into environmental improvement efforts across the Agency. EPA will also develop regulatory incentives that will encourage redevelopment within metropolitan areas and help preserve watersheds, open spaces, and habitats. These incentives will also encourage more environmentally friendly development in rural areas.

In 2004, EPA will continue to implement and expand the National Environmental Performance Track program. The Agency will increase the value of participation in Performance Track by enhancing the benefits and services that members receive. These enhancements will reduce administrative burdens on facilities due to the Agency's issuance of the final Phase I rulemaking. The Agency will also enhance the value of Performance Track as a learning network by completing a "Best Practices" database of innovative practices and tools and by expanding its regional networking for diffusing information about best practices among participants.

EPA will work to deliver proposed regulatory incentives to top environmental performers. The Agency will further explore and develop new regulatory incentives and opportunities for information exchange to encourage better environmental performance. EPA will continue to work with states through pilots, Memoranda of Agreements, and other vehicles to help develop state capacity and cooperation to implement Performance Track and equivalent state programs. EPA will consider incentive projects suggested by internal or external stakeholders, and will work with program offices to foster flexibility in regulations, policy, and guidance and continue reforms in the permitting system. The Agency will continue to conduct application reviews and compliance screens to ensure quality members; site visits to ensure that facilities continue to perform as stated in their applications; and program measurement and reporting to demonstrate the environmental benefits achieved through superior facility performance. EPA also will explore the development of a program to recognize and reward organizations that are truly environmental stewards in terms of their business practices, environmental performance, and public outreach.

EPA's community-based approach works to provide integrated assessment tools and information for environmental protection in partnership with local, state, and Tribal governments. EPA's Regions also provide direct assistance to communities to assist them in

implementing local environmental management efforts and in building capacity for local problem solving. In 2004, EPA will assist local communities with identifying measures of performance and will conduct evaluations of existing projects.

During 2004, the Agency will encourage the widespread use of Environmental Management Systems (EMS) across a wide range of organizations and settings. The Agency will develop additional experience to determine how EMS can help business and government to improve their compliance record, promote “beyond compliance” environmental performance, and improve operational efficiencies. EPA will integrate EMS approaches into several of its assistance and collaborative programs, including Sector Strategies, Performance Track, and Small Business. EPA will build capacity to implement performance-based EMS within EPA, other federal agencies, state and local governments, and the business community.

FY 2004 Change from FY 2003 Request

EPM

- (+\$1,500,000) This request will fund competitive assistance agreements that support state innovation projects.
- (+\$397,400, +0.7 FTE) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters’ contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. *(Total changes -> rent: +\$1,417,000, utilities: +\$2,374,800, Security: +\$3,425,000 and 75 FTE, Human Resources: +\$870,400 and +5.4 FTE, Contracts: +\$642,400 and -18.5 FTE, Grants: +\$3,015,500 and +19.7 FTE)*

There are additional increases for payroll, cost of living and enrichment for new and existing FTE.

Statutory Authorities

National Environmental Policy Act

The Economy Act of 1932

Toxic Substances Control Act sections 4, 5, and 6 (15 U.S.C. 2603, 2604, and 2605)

Pollution Prevention Act (42 U.S.C. 13101-13109)

Clean Water Act

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address Env. Problems

Objective: Demonstrate Regional Capability to Assist Environmental Decision Making.

Demonstrate regional capability to assist environmental decision making by assessing environmental conditions and trends, health and ecological risks, and the environmental effectiveness of management action in priority geographic areas.

Resource Summary (Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Demonstrate Regional Capability to Assist Environmental Decision Making.	\$6,088.7	\$6,591.8	\$6,607.6	\$15.8
Environmental Program & Management	\$3,284.8	\$3,647.1	\$3,662.9	\$15.8
Hazardous Substance Superfund	\$2,803.9	\$2,944.7	\$2,944.7	\$0.0
Total Workyears	2.0	3.0	3.0	0.0

Key Program (Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Facilities Infrastructure and Operations	\$156.1	\$43.6	\$50.8	\$7.2
Management Services and Stewardship	\$2.2	\$1.7	\$2.9	\$1.2
Regional Science and Technology	\$3,574.9	\$3,601.8	\$3,609.2	\$7.4
Superfund Remedial Actions	\$2,944.7	\$2,944.7	\$2,944.7	\$0.0

FY 2004 Request

This request supports the capital budget for acquisition of laboratory and field equipment for the Regional Science and Technology (RS&T) Program. RS&T activities support all of the Agency's national programs and goals. In FY 2004, the laboratory equipment will provide support for Regional implementation of the Agency's statutory mandates through:

- Field Operations for environmental sampling and monitoring,
- Regional Laboratories for environmental analytical testing,
- Quality Assurance oversight and data management support, and
- Laboratory Accreditation.

The Field Operations Unit is responsible for sample collection with established protocols for chain-of-custody documentation. The regional laboratories offer a full range of routine and special chemical and biological testing and/or monitoring in support of regional and national programs including air, water, pesticides, toxics, hazardous waste, ambient monitoring, compliance monitoring, criminal and civil enforcement and special projects. Also, environmental assessments and reports are generated for a specific location, area, or region of the country from information collected and laboratory analysis completed by the Field Operations Unit. The Agency begins the process for developing our State of the Environment Reports by collecting data using established protocols and chain-of-custody procedures and documentation. High quality data and analysis is the foundation for a national report on the state of the environment that helps identify priorities, focus resources on areas of greatest concern and manage our work to achieve measurable results. Quality Assurance and Sampling Protocol Plans are developed for each sample prior to analyses being completed or samples being collected. Field Operations takes the initial charge of supplying and collecting quality analytical data, including hazardous waste sampling and sampling required in criminal cases. On a longer-term basis, this Unit conducts the critical functions of ambient and compliance monitoring, and provides training and technical assistance in a variety of fields.

The RS&T Program provides in-house scientific expertise and technical capabilities in the generation of data for Agency decisions, and in response to emergencies. RS&T divisions support the development of critical and timely data and data review activities. This expertise is also utilized in oversight of state and private laboratory certification for the National Drinking Water Program. The scientific expertise is used to provide advice, expert testimony, and critical environmental analyses in Regional and National program decisions, and civil and criminal litigation and enforcement cases.

Within the Regional Laboratory system, specialized expertise has been developed to respond to specific Regional needs. These capabilities, collectively called the Centers of Applied Science, have broad application and frequently constitute the best knowledge of applied science in the country. Through these Centers of Applied Science, the Regional laboratories are committed to advancing state-of-the-art applied science and sharing that information with state,

local, and other federal agencies through training and other appropriate forums. The Centers have been established in the areas of ambient air monitoring, analytical pollution prevention, environmental biology, environmental microbiology, and environmental chemistry. At these centers, the Agency establishes, by means of scientific data, the State of the Environment Reports for a geographic location, area, or region of the country.

Quality Assurance activities ensure that data and information management systems, including data quality indicators, will be in place to enable EPA and partner agencies to locate, assess, and share environmental data for their program needs. Quality assurance also ensures that data collected for our State of the Environment Reports meets recognized levels of quality from sampling procedures, data documentation, analytical methodology, protocol, and/or statutory guidelines.

RS&T's support of the National Environmental Laboratory Accreditation Program allows for continued confidence that states, local, federal, private and academic environmental testing laboratories are qualified to meet their respective efforts in our goal for equitable environmental compliance at all levels within the environmental regulatory community.

The fast pace of emerging technologies and science requires that the RS&T Program stay at the forefront of new analytical procedures and equipment. An important aspect of its mission is the development and adaptation of analytical methods and procedures. Moreover, this capability serves as the basis for technical advice and assistance to our partner agencies in federal, state, and local government.

FY 2004 Change from FY 2003 Request

There are increases for payroll, cost of living and enrichment for new and existing FTE.

Coordination with Other Agencies

In preparation for catastrophic events, the RS&T Program is developing a chemical analytical response network with state, local and academic laboratory systems. It is also collaborating with the National Guard Civil Support Teams across the nation, and with the Centers for Disease Control. The nexus of this coordination is the front line analytical capability of the RS&T laboratories.

Statutory Authorities

Multi-Media

Environmental Protection Agency

FY 2004 Annual Performance Plan and Congressional Justification

**Sound Science, Improved Understanding of Env. Risk and Greater Innovation to Address
Env. Problems**

Objective: Conduct Peer Review to Improve Agency Decisions.

Conduct peer reviews and provide other guidance to improve the production and use of the science underlying Agency decisions.

Resource Summary
(Dollars in Thousands)

	FY 2002 Actuals	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Conduct Peer Review to Improve Agency Decisions.	\$3,070.0	\$3,690.3	\$4,811.1	\$1,120.8
Environmental Program & Management	\$3,070.0	\$3,690.3	\$4,811.1	\$1,120.8
Total Workyears	19.8	22.5	22.5	0.0

Key Program
(Dollars in Thousands)

	FY 2002 Enacted	FY 2003 Pres. Bud.	FY 2004 Request	FY 2004 Req. v. FY 2003 Pres Bud
Facilities Infrastructure and Operations	\$340.2	\$326.5	\$383.4	\$56.9
Management Services and Stewardship	\$14.9	\$11.3	\$18.7	\$7.4
Science Advisory Board	\$2,887.8	\$3,352.5	\$4,409.0	\$1,056.5

FY 2004 Request

For many years, the goal of the U.S. Environmental Protection Agency's (EPA's) Science Advisory Board (SAB) has been to make a positive difference in the production and use of science at EPA. Established by Congress in 1978, the SAB utilizes non-government technical experts who serve as its 112 members and more than 300 consultants. They come from a broad range of disciplines -- physics, chemistry, biology, mathematics, engineering, ecology, economics, medicine, and other fields. Operating under the Federal Advisory Committee Act (FACA), the SAB empanels technically strong and diverse groups to ensure a balanced range of views from academia, communities, states, independent research institutions, and industry.

In 2004, the EPA SAB plans to enhance its mission by focusing on priority environmental issues that greatly impact overall environmental protection, address novel problems or principles, influence long-term technological development, deal with problems that transcend Agency boundaries, strengthen the Agency's basic capabilities, and/or serve congressional and other leadership interests. The Agency will also provide additional funding to increase public communications and outreach by enhancing website design and presentation of panel information, issue development, and meeting planning.

The Board also recognizes that economic and other social science issues are particularly important, given that EPA has generated new information-based, voluntary approaches to environmental protection -- such as working with stakeholders in communities and sectors to achieve environmental goals that voluntarily go beyond regulatory activities. The SAB initiated a lecture series, "Science and the Human Side of Environmental Protection" to highlight how the social sciences can help solve actual environmental problems.

Additionally, the SAB staff office supports the President's Management Agenda on Competitive Sourcing and has evaluated staff operations and identified several functions that are currently performed by our administrative and technical staff that could be performed by the private sector. Four workyears have been identified for direct conversion to contractors. The direct conversion to contractors will be effective in FY 2003 and beyond. The SAB's attention to competitive sourcing has led to a management review of overall staff operations. The office is in the process of developing an effective human capital strategy, a government-wide initiative that will better identify our human capital needs and how we will acquire, develop, and deploy our human capital to better align our organizational objectives with EPA's mission and goals.

FY 2004 Change from FY 2003 Request

EPM

- (+\$1,000,000) This request will allow the Science Advisory Board (SAB) to initiate an evaluation of the Board's ability to promote the use of sound science at EPA. Further, this request will allow the Board to better meet the needs of its customers by increasing outreach activities and making communications more transparent.

There are additional increases for payroll, cost of living and enrichment for new and existing FTE.

Coordination with Other Agencies

The EPA SAB interacts with comparable advisory bodies within and outside the Agency; in some cases seeking and maintaining liaison and integrated membership with some of these bodies. For example, the chairs of the Office of Research and Development's Board of Scientific Counselors (BOSC), the Federal Insecticide, Fungicide, and Rodenticide Act's Scientific Advisory Panel, and the Children's Health Protection Advisory Committee participate in the quarterly meetings of the SAB Executive Committee meetings. There are also membership contacts and exchanges with technical advisory bodies in the Department of Defense, Department of Energy, and the National Research Council of the National Academy of Sciences. In addition, the SAB has sought interactions with advisory groups at different levels (e.g., the advisory committee to the Mayor of Columbus, Ohio; the environmental advisory board to the Governor of the State of Michigan; the Health Council of the Netherlands; and the Academy of Sciences of Australia). The success of the SAB is measured, in part, by the extent to which the Board is used as a model for advisory boards at various levels of government -- from the local to the international level.

Statutory Authorities

Federal Advisory Committee Act (5 U.S.C. App.)

Environmental Research, Development, and Demonstration Authorization Act of 1978

Clean Air Act of 1977 and 1990.