

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental 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 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Goal 08</b>	<b>Sound Science, Improved Understanding of Env. Risk and</b>	\$334,507.9	\$330,510.3	\$328,757.7	(\$1,752.6)
<b>Obj. 01</b>	Research for Ecosystem Assessment and Restoration	\$110,540.6	\$120,401.8	\$115,130.3	(\$5,271.5)
<b>Obj. 02</b>	Research for Human Health Risk Assessment	\$49,902.0	\$53,678.0	\$58,324.7	\$4,646.7
<b>Obj. 03</b>	Research to Detect Emerging Risk Issues	\$54,935.7	\$46,106.5	\$54,357.3	\$8,250.8
<b>Obj. 04</b>	Pollution Prevention and New Technology for Environmental Protections	\$68,385.2	\$68,172.4	\$52,564.4	(\$15,608.0)
<b>Obj. 06</b>	Increase Use of Integrated, Holistic, Partnership Approaches	\$16,706.6	\$9,286.8	\$17,088.5	\$7,801.7
<b>Obj. 07</b>	Increase Opportunities for Sector Based Approaches	\$20,762.2	\$19,703.4	\$15,921.3	(\$3,782.1)
<b>Obj. 08</b>	Regional Enhancement of Ability to Quantify Environmental Outcomes	\$6,732.0	\$6,089.0	\$7,756.8	\$1,667.8
<b>Obj. 09</b>	Science Advisory Board Peer Review	\$2,486.7	\$2,861.7	\$2,674.0	(\$187.7)
<b>Obj. 10</b>	Incorporate Innovative Approaches to Environmental Management	\$4,056.9	\$4,210.7	\$4,940.4	\$729.7
	Total Workyears	1,200.7	1,057.5	1,048.6	(8.9)

#### Background and Context

One element of EPA's "purpose" as stated in its Strategic Plan is to ensure that "National efforts to reduce environmental risk are based on the best available scientific information." Science allows us to identify the most important sources of risk to human health and the environment, and

thereby guides our priorities, policies, and deployment of resources. Science provides the understanding and technologies needed to detect, abate, and avoid environmental problems. It is critical that research and scientific assessment be integrated with EPA's policy and regulatory activities. In the future, environmental problems will be dealt with using those features of the current system that have proven effective and by designing and testing fundamentally new tools and approaches that utilize the latest advances in scientific knowledge and technology. We will use the latest advances in scientific knowledge and technology to expand the number and variety of approaches for environmental protection.

## **Means and Strategy**

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. 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, EPA program offices and regions, Federal research partners, and outside peer advisory bodies such as the Science Advisory Board (SAB) and others. This input is used internally by cross-office teams that prioritize research areas using risk and other factors such as National Science and Technology Council (NSTC) research and development priorities, client office priorities, court orders and legislative mandates. EPA's research program will increase our understanding of environmental processes and our capability to assess environmental risks – not only to human health, but also to 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 estuaries can be confidently documented, and from which the results of environmental management policies can be evaluated at regional scales. Currently, there is a patchwork of monitoring underway in the estuaries of the U.S. Due to differences in objectives, methods, monitoring designs and needs, these data cannot be combined to estimate, with known confidence, the magnitude or extent of improvement or degradation regionally or nationally in this economically critical resource. Therefore, the ability to demonstrate success or failure of increasingly flexible watershed management policies, regionally and nationally, is also not possible. By the end of 2001, the methods, designs and summary of existing monitoring programs will be in place to develop the baseline required to address these weaknesses. This work is an important step toward providing the scientific understanding to measure, model, maintain, or restore, at multiple scales, the integrity and sustainability of ecosystems.

In order to improve the scientific basis to identify, characterize, assess, and manage environmental exposures that 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 populations to environmental agents, aimed at enhancing current risk assessment and management strategies and guidance. The Agency will develop initial measurements, methods, and models to evaluate exposures and effects of environmental contaminants, particularly in

children. Many of the current human health risk assessment methods, models, and data bases are based on environmental risks for adults. The goal of this research is to address the risks of environmental contaminants in children. This information will be useful in determining whether children are more susceptible to environmental risks than adults and how to assess risks to children.

EPA's leadership role in environmental protection requires a continuing, vigilant search for emerging issues to protect both human and ecosystem health. The Agency will continue to strive to establish research capability and mechanisms to anticipate and identify environmental or other changes that may portend future risk. EPA is currently attempting to focus some of its planning processes and research more expansively on the future. EPA is currently investigating with the help of the National Academy for Public Administration (NAPA) a number of futures methodologies for their potential use in strategic, multi-year, and annual planning efforts. Benefits will include an improved framework for decision-making, increased ability to anticipate and perhaps deter serious environmental risks, and enhanced communication with the public and other stakeholders.

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. The Agency is accumulating data on performance and costs of environmental pollution prevention and control technologies which will serve as a basis for EPA as well as other organizations to evaluate and compare effectiveness and costs of technologies developed within and outside the Agency.

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 and test 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 and incorporation into our system of environmental protection. For example, EPA's Permit Action Plan outlines a broad strategy for building the next generation of environmental permitting. This strategy will harmonize requirements across media and will make permitting more accessible to the public and more flexible for facilities.

EPA's community-based approach works 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. The experience gained in working

with six industry sectors on the Common Sense Initiative provides the basis for moving forward with sector-based approaches to environmental protection.

Sustainable industry programs serve as incubators and developers of innovative approaches to environmental policy-making, testing alternative regulatory and programmatic approaches through regional projects, and multi-stakeholder processes.

Project XL provides regulated entities a gateway to work with EPA, its co-regulators, and other stakeholders to develop and implement alternative environmental management strategies that achieve superior environmental performance in exchange for regulatory flexibility. These initiatives offer a balance between the uncertainty in testing promising new approaches and safeguards to ensure the protection of human health and the environment. These pilots, if successful, will be integrated into our system of environmental protection. Sector-based and facility-based approaches will offer valuable supplements to traditional media-specific environmental policy and, along with place-based and pollutant-based approaches, offer a menu of solutions to environmental issues.

### **Strategic Objectives and FY 2001 Annual Performance Goals**

#### **Objective 01: Research for Ecosystem Assessment and Restoration**

- Establish baseline conditions from which changes, and ultimately trends, in the ecological condition of the Nation's estuaries can be confidently documented, and from which the results of environmental management policies can be evaluated at regional scales.

#### **Objective 02: Research for Human Health Risk Assessment**

#### **Objective 03: Research to Detect Emerging Risk Issues**

#### **Objective 04: Pollution Prevention and New Technology for Environmental Protections**

- 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.

#### **Objective 06: Increase Use of Integrated, Holistic, Partnership Approaches**

## **Objective 07: Increase Opportunities for Sector Based Approaches**

- EPA will develop the next phase program for identifying, implementing & evaluating pilot projects based on the Project XL pilot program.

## **Objective 08: Regional Enhancement of Ability to Quantify Environmental Outcomes**

## **Objective 09: Science Advisory Board Peer Review**

## **Objective 10: Incorporate Innovative Approaches to Environmental Management**

### **Highlights**

#### Research for Ecosystem Assessment and Restoration

In order to balance the growth of human activity and the need to protect the environment, it is important to understand the current condition of ecosystems, what stressors are changing that condition, what are the effects of those changes, and what can be done to prevent, mitigate, or adapt to those changes. By the end of 2001, EPA will establish baseline conditions from which changes, and ultimately trends, in the ecological condition of the Nation's estuaries can be confidently documented, and from which the results of environmental management policies can be evaluated at regional scales. As part of this effort, EPA will issue a report describing the condition of the Nation's estuaries. This report will provide EPA with information needed to determine existing conditions and to develop baseline information from which we can demonstrate the success of watershed management policies.

#### Research for Human Health Risk Assessment

An important aim of human health research in 2001 will be development of initial measurements, methods and models to evaluate exposures and effects of environmental contaminants, particularly in children. The Agency will continue to support a children's research program specifically targeted to address major areas of uncertainty and susceptibility. An important element of the program is the children's research centers. These nine university-based research centers explore a range of children's risk issues, including childhood asthma and development disorders. Other children's research focus on data gaps and endocrine disruptors. A major product of this research in 2001 will be guidance on improving pharmacokinetic model usage for children. The research undertaken in this goal supports the ongoing efforts of the Interagency President's Task Force on Environmental Health Risks and Safety Risks to Children.

#### Research to Detect Emerging Risk Issues

In recent years, EPA has begun moving beyond environmental regulation to environmental protection in its broadest sense, including anticipating and preventing problems before they mushroom into major concerns. In FY 2001, research will focus on improving our understanding of the impact on human health and the environment of exposure to potential environmental pollutants and developing approaches to reduce human health and ecological risks. This research

will result in accessible, common methodologies for combined human health and ecological risk assessments, and sound approaches for risk management so that decision-makers will have the integrated view of risk needed to make intelligent decisions.

### Pollution Prevention and New Technology for Environmental Protections

EPA supports pollution prevention (P2) as a necessary and logical strategy for dealing with high-risk human health and environmental problems that are addressed by Federal, environmental, and health, and safety regulations. P2 research will test the ability of risk assessors and risk managers to develop tools and methodologies which are meaningful and understandable to the public in terms of the costs and benefits associated with the magnitude of the risk that is identified. In the area of new technologies, the Agency also looks to test the performance of commercial-ready technologies through its Environmental Technology Verification (ETV) program. With broad support from industry and other Federal partners, the ETV program will continue to verify the environmental performance characteristics of technologies in all media (e.g., industrial pollution prevention, recycling and waste treatment; field monitoring technologies; and air pollution control and greenhouse gas reduction technologies) under its twelve pilots. In FY 2001, the Agency will deliver a report to Congress on the status and effectiveness of the ETV program during its first five years.

A cornerstone of EPA's ability to collect, manage and provide access to information is a strong commitment to data quality, which is a key foundation in the work of the Information Office. Building on the initial work in EPA's Data Quality Action Plan, we will work to create a more comprehensive and clear understanding of data quality, and its application to our environmental and public health mission. Creating this understanding will be an early focus of the Information Office and its Quality Staff. We will use a Quality Board which will have broad responsibility for leadership, coordination, and oversight of issues related to quality. The Board, which will be supported by a full-time staff, will serve as the EPA focus for ensuring that data quality policies are developed and implemented in EPA programs and applied throughout the life cycle of information that EPA generates and uses.

### Increased Community-Based Approaches

In 2001, EPA will continue to strengthen local partnerships to address serious environmental risks to human health and ecosystems. Regional Geographic Initiatives (RGI) are an approach EPA Regional offices use to partner with states, local governments, private organizations, and others to solve environmental problems. The work targets specific environmental problems identified as high risks to human health and ecosystems, which are not adequately addressed by other Agency resources.

## Increased Facility and Sector-Based Strategies

EPA's strategy for improving our system of environmental protection is to pilot innovative approaches designed to achieve better protection at less cost and, if successful, integrate those pilots into our core practices. Through Project XL, the Agency has a number of innovative ideas that are being tested or implemented in various environmental programs that will lead to changes in rules, permits, information management, environmental stewardship, enforcement and compliance assurance, stakeholder involvement and Agency culture. For example, in XL, EPA is testing ways to streamline permitting so manufacturers can respond more quickly to market demands. In another XL project, EPA is testing alternative ways to implement air regulations to encourage downtown redevelopment and reduce the pressure for sprawl.

A sector-based approach to solving environmental issues complements EPA's analytic toolbox, including community-based, pollutant-based, and traditional media-based approaches. Sector approaches can be used to solve environmental issues as a sole approach, or can be used to complement other approaches to focus on a particular source of a particular pollutant in a particular ecosystem. By using these approaches together to target Agency efforts, focused results are achieved in the most cost-effective and efficient manner possible. By utilizing a sector approach in a collaborative manner, one can garner the information and resources to deal with 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. Sustainable industry programs serve as incubators and developers of innovative approaches to environmental policy-making, and test alternative regulatory and programmatic approaches through regional projects and multi-stakeholder processes.

## Science Advisory Board Peer Review and Consultations

The Agency will continue to support the activities, principally peer reviews, of the Science Advisory Board (SAB), which provides 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 agenda of SAB activities is derived from requests from Congress and the Agency, as well as some self-initiated activities aimed at highlighting attention to areas of concern that may have escaped Agency attention or may be incompletely addressed by individual Agency office programs.

The SAB's broad objective is to help 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 promotes 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.

The use of the SAB for peer reviews also supports the Agency-wide commitment to sound science based on rigorous peer-review, a commitment that has been re-emphasized as a result of

GAO findings in 1997 that such efforts are applied unevenly within the Agency. In addition, the SAB's activities provide the kind of support described in the 1999 National Academy of Sciences report, "Evaluating Federal Research Programs: Research and the Government Performance and Results Act", which concludes that the most effective way of evaluating a federal research program is by expert review, which includes quality review, relevance review, and benchmarking.

### **External Factors**

Sound science is predicated on the desire of the Agency to make human health and environmental decisions based on sound scientific data and information. It challenges the Agency to apply the best available science and technical analysis 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 to both human health and the environment. 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.

The new Office of Policy and Reinvention will lead the Agency's work to explore legislative actions that could strengthen, expedite and stimulate innovative "second generation" approaches to environmental protection.



## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems

##### Objective # 1: Research for Ecosystem Assessment and Restoration

By 2008, provide the scientific understanding to measure, model, maintain, or restore, at multiple scales, the integrity and sustainability of ecosystems now and in the future.

##### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Research for Ecosystem Assessment and Restoration</b>	<b>\$110,540.6</b>	<b>\$120,401.8</b>	<b>\$115,130.3</b>	<b>(\$5,271.5)</b>
Environmental Program & Management	\$0.0	\$8,318.3	\$9,026.0	\$707.7
Science & Technology	\$110,540.6	\$112,083.5	\$106,104.3	(\$5,979.2)
Total Workyears	439.1	344.6	339.3	(5.3)

##### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
CWAP - Related Research	\$1,406.0	\$4,440.6	\$5,298.7
Coastal Environmental Monitoring	\$0.0	\$6,954.0	\$7,255.4
Environmental Monitoring and Assessment Program, EMAP	\$33,153.5	\$30,543.5	\$30,157.8
Rent, Utilities and Security	\$0.0	\$6,754.5	\$7,508.7
Administrative Services	\$0.0	\$1,426.2	\$1,517.3

## **FY 2001 Request**

Natural ecosystems provide valuable services and resources to the public, such as air and water purification, flood control, raw materials for manufacturing and industrial processes, food, as well as less tangible benefits such as recreation. Many human activities alter or damage ecosystems and their ability to provide these goods and services. In order to balance the growth of human activity and the need to protect the environment, it is important to understand the current condition of ecosystems, what stressors are changing that condition, what are the consequences of those changes, and what can be done to prevent, mitigate, or adapt to those changes. Within this context, it is the goal of the EPA's ecological research program to provide the scientific understanding required to measure, model, maintain and/or restore, at multiple scales, the integrity and sustainability of ecosystems now, and in the future. EPA has four primary areas of emphasis within this objective: 1) ecological monitoring research; 2) ecological process and modeling research; 3) ecological risk assessment research; and 4) ecological risk management and restoration research.

### Ecological Monitoring Research

Ecological monitoring research addresses the question, "What is the current condition of the environment, and what stressors are most closely associated with that condition?" The benefits of establishing the condition of an ecosystem are to provide: 1) a standardized set of information from which the magnitude and extent of problems can be assessed and prioritized for research and improvement; 2) an improved understanding of the relationship among stressors and the condition of the resources; and 3) a baseline from which we can determine whether policies (national, regional, and/or local) are having the desired effect.

Highlights of EPA's monitoring research include the Environmental Monitoring & Assessment Program (EMAP) and the coastal monitoring program. EMAP develops the science of monitoring that is required to implement the Committee on Environment and Natural Resources (CENR) National Monitoring Framework, and to develop EPA's capability to measure trends in environmental health, especially the health of freshwater and marine ecosystems. In FY 2001, the Western EMAP study will be a primary activity of EPA's monitoring research. The western study has four areas of focus: 1) the landscape atlas for western states; 2) the intensive study of three watersheds (Columbia River, Missouri River, and San Francisco Bay delta area); 3) coastal monitoring; and 4) surface water indicator development. Of equal importance in FY 2001 will be the second year of the national coastal monitoring program. The purpose of this study is to verify the feasibility of such a program for defining the condition of the estuarine environment, nationally and regionally, cost-effectively and cooperatively with multiple agencies and states. This will also be a key year of reporting on the data obtained in the Eastern Surveys, analyzing these findings and releasing information on the applicability of indicators from studies conducted by EPA.

In FY 2001, EPA will establish baseline conditions from which changes, and ultimately trends, in the ecological condition of the Nation's estuaries can be confidently documented. This is essential to the achievement of this objective as it determines not only the baseline from which we can measure our success or failure at sustaining ecosystems, but is also the type of information

required to help us prioritize where research and management funding is best invested, and to assist in the formation of hypotheses for further research and modeling.

The Environmental Indicators in the Estuarine Environment Research Program (EPA, NASA) will continue as part of the Science To Achieve Results (STAR) research grants program. This four year program, begun in 2000, is designed to identify, evaluate, recommend and potentially develop a suite of new, integrative indicators of ecological condition, integrity, and/or sustainability that can be incorporated into long-term monitoring programs. STAR will also continue to sponsor research grants on the development of national aquatic ecosystem classifications and reference conditions. This research will lead to more rigorous and defensible biocriteria for assessing the condition of aquatic resources and for evaluating the effectiveness of management actions to control point and nonpoint source pollution.

### Ecological Process and Modeling Research

Process and modeling research addresses the question, “What are the biological, chemical, and physical processes affecting the condition of ecosystems and their responses to stressors?” Drawing from information gathered by monitoring efforts, process and modeling research develops a basic understanding of the processes that govern ecosystem function, and the technology to model those processes. This modeling ability 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 accurately achieve the environmental protection goals they seek.

In recent years, various ecological monitoring and assessment tools designed to indicate the general health of our nation’s ecological resources have been developed which are applicable to evaluating ecological conditions of various systems on various spatial scales. While these tools and databases provide an essential foundation for measuring our success in the environmental management arena, implementing them in all areas and for all systems would be prohibitively costly and time consuming, and would not necessarily provide solutions for correcting problems. EPA’s ecological process and modeling program addresses two needs: 1) packaging the ecological monitoring and assessment knowledge gained over the past few years in the form of quantitative modeling systems capable of extending those manual assessments to new areas in a rapid and cost-effective way; and 2) utilizing those modeling systems to evaluate various arrays of possible options for correcting the predicted current or future ecological insults.

The modeling system under development (Multimedia Integrated Modeling System, or MIMS) is a comprehensive, multimedia system capable of providing the watershed and regional manager with a tool to determine the optimal, practical, and/or most effective alternatives for managing surface waters by considering the combined insults originating from air, surface water, ground water and terrestrial transport routes, habitat destruction, and landscape change. MIMS will grant the user community rapid access to a very large array of information and automated analysis tools in a format readily suited to the evaluation of action priorities and abatement options. This work is the foundation for addressing the future integrity and sustainability of our ecosystems.

Without models, there is no ability to project changes before they occur such that we may be able to avoid unintended consequences from our management actions.

### Risk Assessment Research

Risk assessment research addresses the question, “What is 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. Ecological assessments can also be used to compare the relative risks associated with different stressors, different regional areas, and different ecosystems. This is a valuable tool for environmental risk managers at local, state and federal levels, enabling them to link high priority ecosystems with ecosystems at high risk. Ecological assessment research supports Agency efforts to incorporate science into environmental decision-making both within the Agency and in community-based initiatives through: 1) development and validation of methods and guidelines for assessing risk to aquatic and terrestrial ecosystems; 2) the application of Agency-wide ecological risk assessment guidelines by field validation through integrating risk assessment projects; and 3) development of guidance on ecological assessment issues to clearly communicate assessment results to risk managers.

In 1989, concurrent with the beginning of EMAP, EPA in partnership with other Federal and State agencies, as well as academia, began the development of a process, known as the Mid-Atlantic Integrated Assessment (MAIA), to provide integrated environmental assessment information as input into future environmental policy decisions. Ten years of representative regional monitoring provided by EMAP have produced several interim assessment products which are already being utilized by decision-makers. These reports include: *An Ecological Assessment of the United States Mid-Atlantic Region: a Landscape Atlas* (1998) and *The Condition of the Mid-Atlantic Estuaries* (1999). Plans and initial analyses for a cross-resource *Mid-Atlantic State of the Region* report are underway with an initial draft expected in FY 2000.

Following the completion of the first phase of EMAP in the Mid-Atlantic region and establishment of baseline information on the current status of most resources in the region, EPA has initiated a new research project that will build on EMAP and other data to project future environmental conditions in the region so that risk management activities can be targeted in a proactive manner. The Regional Vulnerability Assessment (ReVA) project, begun as part of EPA’s FY 2000 initiative for the National Science and Technology Council’s cross-Agency Integrated Science for Ecosystem Challenges (ISEC), will continue in FY 2001. ReVA will combine modeled projections of changes in stresses (e.g., pollution deposition, land use change) with information on sensitive ecosystems in order to identify: 1) the greatest environmental risks that are likely to occur in the next 5-25 years; and 2) where those risks are likely to occur. ReVA will also integrate socio-economics into the analyses to identify factors driving changes in environmental condition and to better communicate trade-offs associated with alternative policy decisions. Much of the research that will contribute to ReVA is already underway and, in FY 2001, EPA will deliver a draft report on the assessment of vulnerabilities of streams within the Mid-Atlantic region. Given that we will not protect every ecosystem, everywhere, at all times, examining resources and their vulnerability at this larger scale will greatly assist in identifying ecologically important features of the region

which merit special consideration by all managers (local, regional, or national). This scale of consideration is necessary for meeting our objective of sustainable ecosystems.

### Risk Management and Restoration Research

Risk management and restoration research addresses the question, “What options are available to manage the risk to, or to restore, degraded ecosystems?” Given the rate of development of the man-made environment, there is a need to develop cost-effective prevention, control, and remediation approaches for sources of stressors, and adaptation approaches for ecosystems. Cost-effective stressor reduction may not always be feasible or practical as a means to reduce risks. Therefore, it is also important to invest in restoration technologies to diagnose ecosystem restoration needs, evaluate progress toward restoration, and establish ecologically relevant goals and decision support systems for state and community planners.

Many states and natural resource agencies are implementing the Clean Water Action Plan’s call for water quality improvements by promoting riparian zone restoration. In many cases, substantial resources are being devoted to developing and implementing watershed restoration action strategies. The primary focus in FY 2001 for EPA’s ecosystem restoration work will be field experiments on the aquatic stressor reduction effectiveness of riparian buffers in the Mid-Atlantic region and the evaluation of their ecological benefits, including their contributions to habitats and the linkages of terrestrial and aquatic habitats. These critical experiments and careful analyses of other ongoing work will provide the scientific bases for further policy initiatives that accelerate or refine the practice. Another focus in FY 2001 will be the more general problem of inferring restoration needs and priorities from biological status and trends measurements. EPA expects to produce a framework for diagnosing ecosystem restoration needs from biological measurements. In time, the framework can be tested and implemented in the western EMAP study and other regional efforts to produce measurable performance data under GPRA.

The ecosystems protection research program is also supported through the Agency’s Postdoctoral Initiative. The FY 2001 request is the third year of the effort to enhance our intramural research program by supporting 13.4 additional postdoctoral positions under this objective. This enhancement continues to build upon the positive response by the academic community to EPA’s announcement of 50 postdoctoral positions for FY 1999.

**FY 2001 Change from FY 2000 Enacted**

S&T

- (+\$2,443,790, +2.1 FTE) This enhancement to the ecosystem protection STAR grants program will support requests for applications in the following areas: water and watersheds research, integrated ecosystem modeling, and development of the next generation of ecological indicators to support the Agency’s monitoring program, as well as regional ecological assessments.
- (-\$7,641,100) The 2001 request is \$7,641,100 below the 2000 Enacted budget level due to Congressional earmarks received during the appropriations process that are not part of the 2001 President’s Request.
- (-\$683,400) This reduction in resources will decrease the level of effort for lower priority research on ecological processes and effects modeling to determine the ecological effects of atmospheric stresses and their regional extent, as well as for the west-wide stream survey. This reduction will not impact achievement of FY 2001 performance goals and measures.

**Annual Performance Goals and Performance Measures**

**Estuarine Ecosystem Conditions**

- In 2001 Establish baseline conditions from which changes, and ultimately trends, in the ecological condition of the Nation's estuaries can be confidently documented, and from which the results of environmental management policies can be evaluated at regional scales.
- In 2001 Completed 1) three articles on benthic and water quality indicators in estuaries, 2) ecological indicator evaluation guideline document, 3) databases of 30 landscape indicators, 4) article on the relationships between stream and landscape conditions, and 5) a draft large rivers logistics manual.
- In 2000 Report on monitoring findings in the Mid-Atlantic Region as a cost effective means of measuring the condition of these systems.
- In 2000 Develop monitoring designs, including indicators, for streams in western watershed.
- In 2000 Develop monitoring designs for National coastal monitoring.

Performance Measures:	FY 1999	FY 2000	FY 2001
	Actuals	Estimate	Request

Provide baseline landscape indicators for the Mid-Atlantic Region.

Reports on benthic and water quality indicators of condition in estuaries.

Publish an analysis of the trends in

atmospheric deposition and aquatic effects.

Publish Mid-Atlantic region stressor profiles for ozone, acid deposition, pesticides, nitrogen and other stressors.

A final report on the extent and magnitude of fish tissue contamination in small, wadeable streams in the Mid-Atlantic Region as means of identifying high risk areas.

1 final report

Draft design for a National coastal monitoring program to assess the biological condition of estuaries

1 draft design

Final report on the relationship between macroinvertebrate & periphyton assemblages & chemical & physical stressors to verify the applicability of these biological indicators in the Mid-Atlantic.

1 report

Refined coastal health indicators developed and applied in salt marsh estuaries and near coastal water of the Gulf and South Atlantic.

09/30/2000 indicators

Develop a final work plan for western stream condition monitoring.

09/30/2000

Report describing the condition of the Nation's Estuaries.

1 report

Baseline: Currently, there is a patchwork of monitoring underway in the estuaries of the U.S. Due to differences in objectives, methods, monitoring designs and needs, these data cannot be combined to estimate, with known confidence, the magnitude or extent of improvement or degradation regionally or nationally in this economically critical resource. Therefore, it is also not possible to demonstrate the success or failure of increasingly flexible watershed management policies, regionally and nationally. By the end of 2001, the methods, designs and summary of existing attempts will be in place to develop the baseline required to address these weaknesses.

**Integrated Ecosystem Modeling**

In 2002 Publish a proposed modeling system, a regionally applicable conceptual model and modeling research strategy for developing watershed management models

In 2000 Publish a conceptual model for developing watershed assessment techniques that would assist local, regional, and national environmental decision makers in maintaining the ecological integrity of the watershed.

Performance Measures:

FY 1999	FY 2000	FY 2001
Actuals	Estimate	Request

Peer-reviewed draft TMDL Implementation Protocol/ Prototype approach for estimating loadings of sediments to be used by OW, Regions, Tribal Governments, and States in implementation of CWA S.303.

1 protocol

Release of multimedia wildlife exposure assessment model which consists of a computer friendly system to assess and integrate exposures of wildlife to env. contaminants in soil,water,food,and air	1	model
Develop expanded guidance for performing an ecological risk assessment; conduct a series of colloquia and a workshop on ecological assessment issues	09/30/2000	guidance
Final report on relationships between wetland extent and land-use patterns with stream water quality and biotic communities in watersheds of the Lake Superior basin.	1	report

Baseline: Currently the models to help watershed managers forecast the response of lakes, streams, rivers and estuaries to alternative management options are inadequate. Further, few models can be credibly linked to conduct multimedia evaluations (e.g. would Nitrogen removal from air be equal to the Nitrogen removal from agriculture?) due to many differences in modeling systems employed. By 2001, the potential for a new modeling system can be evaluated for its use to link existing and future models to improve the forecasting of alternative watershed management options. If successful, it will revolutionize the ecological modeling field for environmental managers.

**Regional Scale Ecosystem Assessment Methods**

- In 2001 Develop methods for regional scale, comparative risk/vulnerability assessment using the Mid-Atlantic Region as a case study.
- In 1999 Completed an ecological risk assesement guidelines follow-on project report, as well as two watershed assessment studies.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request
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Ecological risk assessment guidelines follow-on project report.

Report to CENR on use of Ecological Risk Assessment in the Federal Government.

Development and use of ecological information management system.

Final report and data base on landscape change in the Mid-Atlantic states between the early 1970s and the early 1990s, based on remotely sensed monitoring data, and the consequences for water quality	1	report, database
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Estimating Vulnerability of Streams and Ground Water to Sediments, Nutrients, Pesticides, and Toxic Substances: Applying Landscape Assessment Tools to the Mid Atlantic Coastal Plain.	1	journal article
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Develop a probability-based methodology for



conducting regional aquatic ecosystem exposure and vulnerability assessment, for pesticides.	1	methodology
Provide Peer-review Publication on: The Spatial Distribution and Trend Analysis of Sulfur and Nitrogen Deposition in the Eastern United States.	1	publication
Develop a report using the Ecological Risk Assessment Guidelines approach to conducting an ecological risk assessment at the regional scale: a Proof of Concept.	1	report
<p>Baseline: Improvements to ecosystem protection have been made by considering watershed scale management, especially for evaluating water quality. However, there is no current means (i.e., assessment tools) to help environmental managers decide where, and on what, they should spend money--when faced on deciding priorities among pollutants, other stressors, ecological resources, and locations, to mention but a few factors. By 2001, we will have provided the first tools to meet such a goal and improve the odds of getting the maximum return on the investment.</p>		

## **Verification and Validation of Performance Measures**

### **Goal 8 Objective 1**

**Performance Measure: Report describing the condition of the Nation's estuaries.**

**Performance Database: Output**

**Data Source: N/A**

**QA/QC Procedures: N/A**

**Data Quality Review: N/A**

**Data Limitations: N/A**

**New/Improved Data or Systems: 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 go beyond resource management assigned to other agencies like NOAA's National Marine Fisheries Service, USDA's Forest Service, and DOI's Fish and Wildlife Service 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 Multimedia Integrated Modeling System is coordinated with the Department of Defense (DOD) Corps of Engineers, USDA, and DOE. EPA participates in the Integrated Sciences for Ecosystem Challenges initiative formulated by CENR's Subcommittee on Ecological Systems, where the Agency participates in restoration of habitats and species, impacts of landscape change, invasive species, and inventory and monitoring programs. EPA is also represented on the Interagency Working Group on the Water Cycle, which is developing a research strategy and scientific plan for investigating the global water cycle.

EPA also participates in the interagency Water and Watersheds research grants program. This program is co-sponsored by EPA, the National Science Foundation, and USDA. Integrating the physical, biological and social sciences, this research is focused on developing watershed assessment and restoration approaches and decision tools that will assist resource managers in making decisions based on sound science. Additional interagency grants programs in Ecology include the Coastal Index Sites Network (CISNet), co-sponsored with NOAA and NASA, and the Ecology and Oceanography of Harmful Algal Blooms (EcoHAB) program with NOAA, NSF, DOD, and NASA.

EPA's STAR program also participates in the interagency Water and Watersheds research grants program. This program is co-sponsored by EPA, the National Science Foundation, and USDA. Integrating the physical, biological and social sciences, this research is focused on developing watershed assessment and restoration approaches and decision tools that will assist resource managers in making decisions based on sound science.

### **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 2001 Annual Performance Plan and Congressional Justification

#### Provide Sound Science to Improve Understanding of Environmental Risk and Develop and Implement Innovative Approaches for Current and Future Environmental Problems

##### Objective #2: Research for Human Health Risk Assessment

Provide the scientific basis for responding to a wide range of environmentally-driven human health problems by developing methods, models, and data that have broad applicability.

#### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Research for Human Health Risk Assessment</b>	<b>\$49,902.0</b>	<b>\$53,678.0</b>	<b>\$58,324.7</b>	<b>\$4,646.7</b>
Environmental Program & Management	\$18.8	\$4,541.1	\$4,948.2	\$407.1
Science & Technology	\$49,883.2	\$49,136.9	\$53,376.5	\$4,239.6
Total Workyears	225.5	193.4	182.8	(10.6)

#### Key Programs (Dollars in thousands)

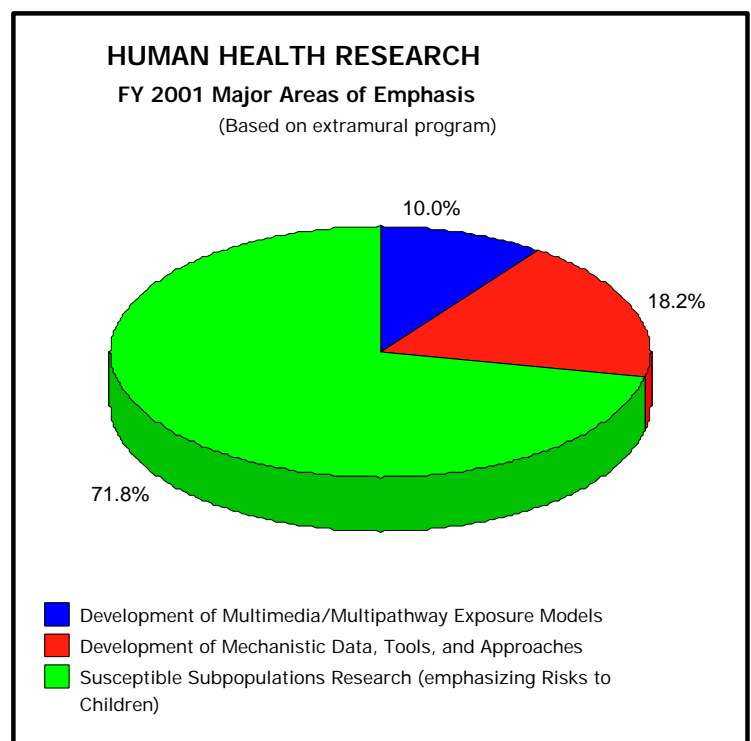
	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Endocrine Disruptor Research	\$0.0	\$379.3	\$387.9
Human Health Research	\$49,652.2	\$48,883.9	\$52,998.6
Rent, Utilities and Security	\$0.0	\$9,651.7	\$4,258.7
Administrative Services	\$0.0	\$606.1	\$644.3

## FY 2001 Request

During much of its history, EPA has focused its human health risk management decisions and regulations on single environmental pathways and individual contaminants. Often, this approach has been mandated by environmental legislation. In recent years, 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 legislation. These advances illustrate the significance of new risk management options for EPA--replacing, as appropriate, the “one-size-fits-all” approach to risk management with a more population/geographic-specific approach where risk management options can be developed for the general population, specific age groups (e.g., infants and children), or other susceptible subpopulations.

Today, the practice of risk assessment and risk management helps to identify scientific issues that cut across the elements of the risk assessment paradigm (exposure, dose response, hazard identification, risk characterization). Creating a strong scientific foundation for risk assessment and for subsequent risk management decisions requires research to reduce significant areas of scientific uncertainty and to develop the methods, models, and data needed to support EPA’s scientific and regulatory programs. To that end, EPA’s Human Health Risk Assessment research program will continue to pursue three main strategic directions over the next several years: 1) improve predictive linkages between exposure and effects research; 2) harmonize cancer and noncancer risk assessments; and 3) assess the effectiveness of environmental decisions in protecting public health. Moving toward these strategic directions, the Agency will

continue to support research to improve our understanding of the exposure-dose-effects continuum through development of multimedia/multipathway models, biomarkers, and mechanistically based improvements in hazard identification and extrapolations. In FY 2001, research will be undertaken in three key areas of activity: 1) development of multimedia/multipathway exposure methods and models, 2) development of mechanistically-based data, tools, and approaches, and 3) susceptible subpopulations, which will emphasize risks to children. Following is a detailed discussion of the FY 2001 program in terms of these three activity areas.



## Multimedia/multipathway exposure methods and models

EPA is committed to developing models to assess, predict, and diagnose the population distribution of multimedia/multipathway exposures to major classes of environmental agents. A number of exposure related activities will be undertaken in achieving this objective. They have been chosen to address substantial uncertainties that exist in human health risk assessment and, thereby, improve the scientific basis for assessing and managing risks. They include: 1) human exposure measurement research, 2) research to develop multipathway, cumulative, and aggregate exposure models and databases, 3) research on children's exposure in residential micro-environments, and 4) research to improve risk assessment techniques, data bases, and models. This research seeks to improve the core science in these areas by focusing on multimedia/multipathway exposures to pesticides and other consumer products and major exposure venues, including residential.

In FY 2001, human exposure measurement research will continue to develop, demonstrate, and evaluate human exposure measurement and surveillance investigations along the U.S. - Mexican Border in conjunction with the Border XXI (NAFTA) program. Areas of emphasis for the Border program in FY 2001 will include: 1) exposure studies that investigate children's exposure to pesticides, and 2) studies that investigate the potential for differential exposures which may be related to contaminants from agricultural pesticide application and other activities along the border.

Research on multipathway exposure models and databases will continue to develop, demonstrate, and evaluate measurement-based models that represent multipathway source-exposure-biomarker-dose relationships and the physical and chemical factors that affect potential and absorbed doses. Research in this area will also develop and distribute exposure measurement and activity pattern databases. An important area of emphasis in FY 2001 will be analysis of National Human Exposure Assessment Survey (NHEXAS) data. Additional analyses of the NHEXAS pilot study data will be conducted, as will feasibility studies to demonstrate the benefits and costs of a national-scale exposure program.

Research on children's exposure and surveillance will focus on improving our understanding of exposures of infants and children in residential microenvironments - particularly to pesticides and toxic substances. More specifically, research will continue to focus on 1) improving our understanding of the scientific relationships between exposure and the biological markers of exposure (e.g., urinary biomarkers and immunoassay techniques); and 2) developing field measurement and analytical protocols. Other research focusing on children will look at integrating measurements and modeling to investigate multipathway, cumulative, and aggregate exposures to contaminant mixtures for infants and children, with emphasis on micro environmental exposures that will reduce significant uncertainties in how and where the exposure of infants and children differ from that of the general population.

The information developed from application of methods, models, and data developed under this research program may significantly improve our understanding of the extent of human exposure to specific pesticides and toxic substances. Methods resulting from this research will be incorporated into the Agency's battery of testing guidelines.

## Mechanistically-based Data, Tools, and Approaches

The Agency faces limitations in its ability to assess health risks of environmental exposures both qualitatively and quantitatively because of a lack of understanding about the underlying biological, chemical, and physical processes that determine target tissue exposures and effects. Without sufficient knowledge of these processes, uncertainties are introduced into the risk assessment process that allow wide interpretation of what is often limited data. Research associated with this activity addresses both qualitative (hazard identification) and quantitative (dose-response analysis) concerns associated with current risk assessments.

Under this research program, EPA is committed to reducing reliance on methodologies that rely on default assumptions by providing mechanistically-based data, tools and approaches for more quantitative and biologically defensible human health risk assessments. EPA will pursue a focused program to reduce significant uncertainties in EPA's ability to identify and characterize health hazards, and then quantify, model and assess exposure-dose-response relationships.

More specifically, health effects research will continue to focus on mechanistically-based risks and development of fundamental tools such as biomarkers of effect and susceptibility to address risks posed by cumulative and aggregate exposures, exposure to chemical mixtures and risks to susceptible populations (such as the elderly, children or persons predisposed to disease). Methods will be developed to elucidate the critical physiologic and mechanistic factors that contribute to health effects in laboratory animals and humans. Research to determine the effects of varying route, dose, dose-rate, duration and cumulative dose on health outcomes will be used to develop mechanistically-based models. Mechanism-of-action information will improve confidence in the qualitative assessment of hazard and also lead to hypothesis-driven research to elucidate the cascade of events linking exposure and disease, consequently improving our ability to perform more biologically-based dose-response estimates.

Risk assessment research will focus on providing methodologies, prototypical assessments, and guidance for risk assessors on the use of information on 1) common levels of "response" for risk assessment, 2) common dose metrics for risk assessment, and 3) framework and guidelines for harmonized and integrated risk assessments.

### Susceptible Subpopulations

EPA is committed to developing and verifying innovative methods and models for assessing the susceptibilities of populations (i.e. children and individuals with compromised immune systems) to environmental agents, aimed at enhancing current risk assessment and management strategies and guidance. The primary focus of this research is related to children's health and is discussed in further detail below.

### *Children's Health Research Program*

Research on the unique health risks of infants and children is particularly needed as suggested by national scientific advisory organizations, the Administration, and Congress. In 1993, the National Academy of Science (NAS) issued its report, *Pesticides in the Diets of Infants and Children*, which drew attention to health effects and exposure research needed to improve our understanding of the impact of pesticides on children's development and overall health. Three years later, in 1996, Congress enacted the Food Quality Protection Act (FQPA), which mandates, among other things, a single health-based standard for all pesticides in all foods and provides special protections for infants and children. Also in 1996, the Administrator issued a report entitled *Environmental Health Threats to Children* and established a Children's Agenda for EPA, calling for consideration of children's risks in all Agency actions and a greater emphasis on research to support children's risk assessments. In 1997, the President issued an Executive Order addressing protection of children from environmental health risks. The research in this objective supports the interagency efforts of the President's Task Force on Environmental Health Risks and Safety Risks to Children.

Much of the effort under the Children's program is based on the Draft ORD Strategy for Research on Environmental Risks to Children, which provides direction for research in age-related exposures, physiology, and biological responses that may result in increased risks, and research in risk reduction methods. This research will result in better EPA risk assessments for children and reduced risks from environmental health threats. In FY 2001, Children's Health Research will continue a strong program to provide the data to strengthen Agency risk assessments for children, both in the near and long term.

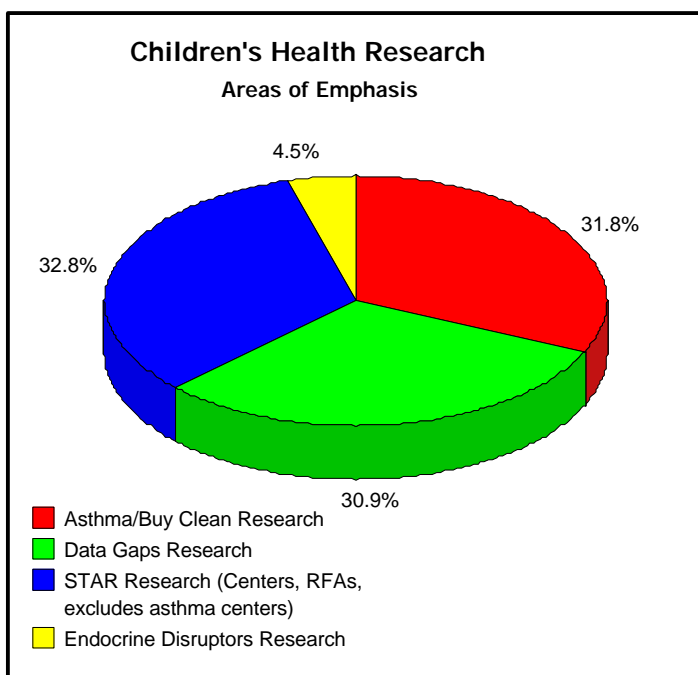
EPA began to address environment-related childhood diseases in 1998 by establishing, in cooperation with the National Institute of Environmental Health Sciences (NIEHS) and the Centers for Disease Control (CDC), eight university-based pediatric environmental research centers. These Centers conduct basic and applied research in combination with community-based prevention efforts. Their aim is to better understand the causes of environmentally-induced disease among children and to eventually decrease the prevalence of childhood disease. Their efforts are focused on childhood asthma and other lung diseases, children's respiratory disease, growth and development, children's susceptibility to pesticides, and airway disease. In FY 2000, the Agency enhanced these efforts by establishing a ninth pediatric center to study developmental disorders. These children's centers will continue their efforts in FY 2001.

In addition to these university-based research centers, the Agency will continue to support extramural and in-house children's research through a variety of other efforts initiated in FY 2000, including the following:

- Buy Clean: Due to a lack of sufficient technical information that can be used by school systems around the country to make informed decisions about which water-based cleaners pose acceptable risks to children, the Agency will continue to support research to develop test procedures and create market incentives for the manufacture and use of products, including

water-based cleaners, that result in improved indoor air quality. This research will provide the technical information to serve as the scientific basis to upgrade guidance to schools.

- **Data Collection:** Thousands of man-made chemicals have not been tested for human health effects, and of those that have been tested, testing is often incomplete and does not address effects that might be seen in children. In addition, exposure measurements have been made for only a small fraction of these chemicals, and few exposure studies have focused on children until recently. Therefore, the Agency will continue to support research to develop data to improve its ability to assess these chemicals by investigating effects on developing organs, tissues and systems, and by developing data on factors that contribute to increased susceptibility and exposure in children.



- **Asthma:** EPA will continue to conduct research that will integrate human exposure, epidemiologic and clinical studies and mechanistic lab research (employing animal models of asthma) to further our understanding of the role of environmental pollutants in the induction/exacerbation of pediatric asthma. This effort includes collaboration with other public health agencies, including participation in two unique interdisciplinary studies of two groups of children. This research supports the FY 2000 Asthma Initiative, a proposal by EPA and HHS as part of the President's Task Force on Environmental Health Risks and Safety Risks to Children.
- **Endocrine Disrupting Chemicals (EDC):** To address evidence suggesting that the effects of EDC exposure in children could be different from those experienced by adults, EPA will continue to support the development of methods to evaluate hazards that are quantitatively or qualitatively different from those observed in adults in immature organisms exposed to EDCs. Efforts will ensure that state-of-the-art science is incorporated into regulatory test methods and guidelines across the Agency.

The new/improved data, methods, models, and guidance resulting from efforts under the Human Health Research Program will support more effective Agency implementation of a variety of legislative mandates, particularly the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Toxic Substance Control Act (TSCA), the Federal Food, Drug, and Cosmetic Act (FFDCA), the Food Quality Protection Act (FQPA) of 1996.



This research program is also supported through the Agency's Postdoctoral Initiative. The FY 2001 request represents the third year of the effort to enhance our intramural research program by supporting 3.0 additional postdoctoral positions under this objective. This enhancement continues to build upon the positive response by the academic community to EPA's announcement of 50 postdoctoral positions for FY 1999.

**FY 2001 Change from FY 2000 Enacted**

S&T

- (+1,220,000 extramural) This is an initiative to provide support to the National Human Exposure Assessment Survey (NHEXAS). Resources will support additional analyses and feasibility studies to demonstrate the benefits and costs of a national exposure program. In achieving this task, Agency research laboratories and centers will coordinate research to investigate multipathway, cumulative and aggregate exposures to contaminant mixtures by integrating exposure measurements and modeling. This initiative will improve the Agency's ability to meet its objective of reducing uncertainty in human health risk assessment.
- (+\$3,010,500, -4.3 workyears) The R&D program, including infrastructure support costs, is spread across eight of the ten goals in the Agency's GPRA/budget structure. Based on a review of actual infrastructure utilization under each goal (i.e., utilization of workyears and associated PC&B, travel, operating expenses, and working capital fund), adjustments are being made across goals to more accurately reflect expectations for use in FY 2001.

**Annual Performance Goals and Performance Measures**

**Human Health Risk Assessment Research**

In 2001 Implement completed Human Health Risk Assessment Research Strategy focusing on research to improve extrapolation, cumulative and aggregate risks, mixtures, susceptible populations, harmonization of cancer and non-cancer risk assessments, and evaluating the effectiveness of public health decisions.

In 2000 Develop risk assessment guidance and regional assessments concerning risks to children exposed to environmental contaminants.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request
Assess pesticide exposures to children in Washington, Minnesota, and Arizona.		1	assessment
Report on the use of mechanistic data in developmental toxicity risk assessment.		1	report
Develop exposure factors handbook for children		1	Handbook

Publish peer reviewed research strategy on human health risk assessment.	1	resrch strategy
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NHEXAS: Begin implementation of Strategic Data Analysis Plan.	1	strategic plan
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Baseline: Historically, the goal of EPA's Human Health Risk Assessment Research has been to reduce uncertainties in risk assessment. Much of this program focused on uncertainties associated with extrapolation of animal data to predict human health risks. In addition to publishing the final peer reviewed strategy, EPA will develop guidance, methods, and models that will coordinate EPA's research effort linking exposure and effects research, harmonizing cancer and noncancer risk assessments, and evaluating whether EPA's policy and management decisions have improved public health.

**Exposures and Effect of Environmental Contaminants**

In 2001	Develop initial measurements, methods and models to evaluate exposures and effects of environmental contaminants, particularly in children.
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In 2000	Develop initial measurements, methods, and models to evaluate exposures and effects of environmental contaminants, particularly in children.
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In 1999	Completed a first generation chlorpyrifos/pesticide exposure model and a technical report on children's activities associated with potentially high exposures.
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Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request
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Develop and validate first phase models using mechanistic data to predict toxicity for two noncancer endpoints following less-than-lifetime exposures to environmental contaminants.	2 (min)	report
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Develop first generation multimedia and multipathway exposure models for infants, children, and the general population.	1	model
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First Generation Residential Exposure Models

Guidance on improving PK model usage for children.	1	guidance
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Baseline: Many of the current human health risk assessment methods, models, and data bases are based on environmental risks for adults. This research will be used to assist in determining whether children are more susceptible to environmental risks than adults and how to assess risks to children.

## **Coordination with Other Agencies**

EPA is a co-leader in the effort to inventory and coordinate research in children's environmental health and safety across the federal government through the President's Task Force on Environmental Health Risks and Safety Risks to Children, which is co-chaired by the EPA Administrator and the Secretary of Health and Human Services. The Research Subcommittee of the Task Force, co-chaired by representatives of EPA and NIEHS, consists of approximately 20 agencies involved in children's health and safety issues. The Research Subcommittee is developing a federal government-wide inventory of research related to children and a federal research agenda. Special subcommittees on childhood cancer, asthma, developmental disorders, and unintentional injuries to children are developing research initiatives. EPA is participant in the first three subcommittees.

Several Federal agencies sponsor research on variability and susceptibility in risks from exposure to environmental contaminants. NIEHS achieves its mission through a multidisciplinary biomedical research program, prevention and intervention efforts, and communication strategies that encompass training, education, technology transfer, and community outreach. In 1998, in collaboration with NIEHS, EPA established eight Centers for Children's Environmental Health and Disease Prevention to define the environmental influences on asthma and other respiratory diseases, childhood learning, and growth and development.

In addition, the NIEHS and the National Institute of Allergy and Infectious Diseases (NIAID) are conducting the Inner-City Asthma Study, which is a prevention trial to develop an intervention strategy to reduce asthma morbidity in inner-city children and adolescents. The National Allergen Study, being conducted by NIEHS in collaboration with the Department of Housing and Urban Development (HUD), will examine the relationship between allergens and lead and will also focus on how allergen exposures differ as a function of geographic region, socioeconomic status, housing type, and ethnicity.

The Agency has worked on interagency task forces with a number of federal agencies, including National Institute for Occupational Safety and Health (NIOSH), National Institute of Environmental Health Sciences (NIEHS), Federal Drug Administration (FDA), and Consumer Product Safety Commission (CPSC), in developing health risk assessment guidelines (e.g., Carcinogen Risk Assessment Guidelines, Developmental Toxicity Guidelines, Exposure Assessment Guidelines) and has maintained interagency agreements with NIOSH and NIEHS.

Historically, EPA has maintained formal research agreements with CDC, NIEHS, National Institute of Child Health and Human Development (NICHD), NIOSH, and FDA for the conduct of regional-scale human exposures studies such as NHEXAS and the U. S. - Mexico Border XXI Studies. Current participants in NHEXAS include federal agencies (CDC, FDA, and National Institute of Standards and Technology (NIST)), state environmental and health agencies (Arizona, Maryland, Massachusetts, Michigan, Illinois, Indiana, and Minnesota), EPA Regions (Regions 3, 5, and 9), and academic research institutions. The Director of NIEHS has invited EPA to participate in developing an expanded federal partnership to plan for future NHEXAS studies. Current federal participants in the Border XXI Program include the HHS agencies (CDC, FDA, Agency for Toxic Substances and

Disease Registry (ATSDR)), EPA Regions 6 and 9, and State Health and Environmental agencies in Texas, Arizona, New Mexico, and California.

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justificaton

#### Provide Sound Science to Improve Understanding of Environmental Risk and Develop and Implement Innovative Approaches for Current and Future Environmental Problems

##### Objective #3: Emerging Risk Issues

Establish capability and mechanisms within EPA to anticipate and identify environmental or other changes that may portend future risk, integrate futures planning into ongoing programs, and promote coordinated preparation for and response for change.

#### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Research to Detect Emerging Risk Issues</b>	<b>\$54,935.7</b>	<b>\$46,106.5</b>	<b>\$54,357.3</b>	<b>\$8,250.8</b>
Environmental Program & Management	\$7,216.1	\$8,561.4	\$8,821.9	\$260.5
Science & Technology	\$47,719.6	\$37,545.1	\$45,535.4	\$7,990.3
Total Workyears	192.2	156.0	160.2	4.2

#### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Reinvention Programs, Development and Coordination	\$0.0	\$7,057.0	\$7,264.1
Endocrine Disruptor Research	\$12,098.4	\$7,658.7	\$12,853.2
Exploratory Grants Program	\$12,038.0	\$10,803.5	\$10,669.0
STAR Fellowships Program	\$8,941.0	\$8,952.6	\$10,089.9
Rent, Utilities and Security	\$0.0	\$396.8	\$410.3
Administrative Services	\$0.0	\$454.2	\$508.2

## **FY 2001 Request**

A clear vision of future environmental risk will enable EPA to manage strategically for tomorrow and tactically for today. Research benefits include an improved framework for decision-making, increased ability to anticipate and perhaps deter serious environmental risks, and enhanced communication with the public and other stakeholders. This objective responds directly to recommendations of numerous external advisory panels that EPA improve its capacity to identify emerging environmental risks, the respective long-term trends that would shape such environmental risks, and major planning and policy issues related to associated research, monitoring, and intervention. This new understanding will help to develop a process for identifying and conveying recommendations concerning potential risks in the future.

EPA is improving its capacity to identify risk through Endocrine Disruptors Research, Mercury Research and graduate fellowships and exploratory grants under the Science to Achieve Results Program (STAR).

### Endocrine Disruptors

Evidence has been accumulating that humans and animals, both domestic and wildlife species, have suffered adverse health consequences resulting from exposure to environmental chemicals that interact with the endocrine system, known as endocrine disrupting chemicals (EDCs). To date, these problems have primarily been identified in wildlife species with relatively high exposures to specific compounds, including organochlorines such as DDT and its metabolites, PCBs and dioxins, or in domestic animals foraging on plants with high levels of phytoestrogens (Kavlock et. al, 1996). In humans, the effects of prenatal exposure to diethylstilbestrol (DES) on the reproductive tract of both females and males are known, and developmental neurological problems have been identified in children exposed to PCBs and/or polychlorodibenzofurans (PCDFs). This specific reference can be found in the National Academies of Science report "Hormonally Active Agents in the Environment (1999)". In addition, there are reports of declines in the quality and quantity of sperm production in humans over the last four decades, and increases in certain cancers that may have an endocrine-related basis (breast, prostate, testicular), leading to speculation about environmental causes. This specific reference can be found in EPA's Office of Research and Development report "Research Plan for Endocrine Disruptors", EPA/600/R-98/087, February 1998.

Despite these reported effects, we know little about their causes and the concentrations of EDCs that would induce effects in various populations. Based upon recognition of the potential scope of the problem, the possibility of serious effects on the health of populations, and the persistence of some endocrine disrupting agents in the environment, the ORD published "Research Plan for Endocrine Disruptors" in 1998. In FY 2001, endocrine disruptors research will continue to support an integrated program of effects, exposure, risk assessment and risk management research.

Effects research on EDCs will focus on: 1) evaluation of the adequacy of current testing guidelines for assessment of EDCs; 2) determination of the classes of chemicals that act as EDCs and their potencies; 3) determination of the dose-response curves for EDCs at environmentally relevant

concentrations; 4) development of tools to monitor the health of individuals inhabiting areas of EDC contamination; and 5) integration of human and ecological effects research with exposure research. This research is needed to determine the nature and extent to which environmentally relevant exposures to chemicals are producing adverse effects in humans and wildlife species.

Exposure research will identify and increase our understanding of major exposure routes and processes, and develop predictive models for estimating the extent and magnitude of exposures of humans and ecosystems to persistent bioaccumulative toxicants (PBTs), particularly those classified as EDCs. EPA will conduct integrated toxicology and exposure studies in ecological systems or human populations with suspected contamination or exposure.

Risk assessment research will continue to develop an analytical framework for evaluating impacts of reported endocrine disruptor phenomena. Research will focus on: 1) identifying key risk assessment issues for endocrine disruptors; 2) providing methods for evaluating data on effects of EDCs on human health and the environment; 3) developing a framework for assessing EDCs; and 4) developing guidance for assessing EDCs. Finally, risk management research will focus on developing mitigation measures for EDCs.

## Mercury

The *Clean Water Action Plan* describes mercury as a complex environmental challenge. Mercury is released from a variety of sources, exhibits a complicated chemistry, and proceeds via several different pathways to humans and wildlife. Methylmercury is known to have toxic effects on humans and wildlife. Mercury is a toxic, persistent, bioaccumulative pollutant that affects the nervous system, and Methylmercury is the chemical species that bioaccumulates in fish. People who consume large amounts of fish are at risk of adverse effects of methylmercury on the nervous system. Because the developing nervous system is more vulnerable to mercury toxicity, children exposed to methylmercury through their mother's consumption of fish and individuals who eat large amounts of fish from local waters are particularly at risk of adverse effects.

According to the EPA's *Mercury Study Report to Congress*, mercury fluxes and budgets (essentially, availability in the Earth's outer crust) in water, soil, and other media have increased by a factor of two to five over pre-industrial levels. Since mercury is a natural metallic element and does not degrade to simpler compounds, it will always be present in the environment in one form or another. As the quantity of available mercury in the environment has increased, so have the risks of neurological and reproductive problems for humans and wildlife, making it a pollutant of considerable human health and environmental concern. The presence of mercury is the most frequent basis for fish advisories, represented in 60 percent of all water bodies with advisories. Forty-one states have advisories for mercury in one or more water bodies, and eleven states have issued statewide mercury advisories.

ORD's mercury research program was established in response to a growing scientific concern and public awareness regarding potential effects of human and environmental exposure to mercury. In FY 2001, EPA's mercury research program will focus on mercury control and prevention, and mercury monitoring and modeling.

Mercury control and prevention research will support the regulatory determination for utilities which will have to be made by FY 2001. If it is determined that mercury should be regulated, the Agency's research will also support the proposed rule on mercury controls for utilities which is targeted for FY 2004. In addition, mercury standards developed for combustion sources such as commercial and industrial boilers and hazardous waste incinerators will benefit from mercury control and prevention research. Efforts related to non-utilities research will address mercury-producing sources such as chlor-alkali plants and gold-mining. EPA will provide expertise for development of control technology for non-utility sources of mercury.

Mercury monitoring and modeling research will focus on understanding the problems posed by mercury releases to the environment. Research in this area will increase through the FY 2000- 2004 time period to allow a better understanding of this issue for future regulatory efforts on mercury. The finalized National Academy of Sciences (NAS) report on the health effects of mercury is expected in FY 2000. EPA will analyze and interpret the report to derive an Agency position on risk assessment for mercury. This will be critical to the regulatory determination on mercury controls for utilities planned for FY 2001. Continued support in health assessment will be needed in FY 2001. Support for a Total Maximum Daily Loading (TMDL) on mercury utilizing ecological data will be provided through this research over the longer term.

Research also will seek to improve communication of the risks of mercury to those especially susceptible populations, such as pregnant women and children, who are at risk of elevated exposures to methylmercury from fish.

#### Graduate Fellowships and Exploratory Grants

Two important elements of the STAR program are Graduate Fellowships and Exploratory Grants. A blue ribbon panel of the Science Advisory Board recommended that EPA enhance its environmental education programs for training the next generation of scientists and engineers (Fellowships/Environmental Education). The graduate fellowship program was initiated in 1995 for that purpose. This competitive, peer-reviewed program is designed to attract some of the brightest and most dedicated students in the Nation to take advanced training in scientific and engineering disciplines relevant to protection of public health and the environment and, ultimately, to careers in environmental science and engineering – not only for EPA, but for states, localities, and industry. Beyond developing young minds for future needs, fellowship studies bring fresh ideas to bear on EPA science issues. Work done under the fellowship program helps resolve uncertainties associated with particular environmental problems and focuses graduate research on priority research areas. In FY 2001, the Agency expects to support fellowships across multiple disciplines, including the biological and physical sciences, mathematics and computer science, and engineering.

In FY 2001, the Exploratory Grants research program will generate new ideas and produce new scientific information by encouraging creativity and innovation in scientific research. Through publication of an annual general solicitation, the program defines general areas in which there exist significant gaps in scientific knowledge and understanding, and allows 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 can receive attention under the Exploratory Grants program.

Proposals are competitively reviewed by panels of predominantly outside Agency researchers, with only the most scientifically sound proposals ultimately receiving support. The major program outputs are scientific articles published in the peer literature. The scientific information shared through such publications is intended to broaden and enhance scientific knowledge and understanding and to be used as inputs into more targeted, more applied environmental research programs.

ORD will work with the Agency's Office of Administration and Resource Management to ensure that opportunities to compete for STAR grants are available to Historically Black Colleges and Universities (HBCUs) and Hispanic Serving Institutions (HSI). This is consistent with the President's Initiative on HBCUs (EO 12876) and the Presidential Initiative on Education of Excellence for Hispanic Americans (EO 12900).

This year ORD has started an evaluation of the STAR program by the Agency's Science Advisory Board and ORD's Board of Scientific Counselors. The first report in this evaluation is scheduled to be released in March 2000.

## **FY 2001 Change from FY 2000 Enacted**

### S&T

- (+\$4,841,800) This enhancement will support efforts under the Endocrine Disruptors (EDC) research program. In accordance with the multi-year research plan published in February 1998, the EDC program will expand its efforts to develop a better understanding of the potential effects of EDCs on human health. In FY01, EPA and other federal agencies, under the auspices of the NSTC's Committee on Environment and Natural Resources, will issue a joint Request for Applications (RFA) for grants for studies that will investigate the relationships between exposure to endocrine disruptors and reproductive/developmental effects in humans. EPA's resources, leveraged with those of the other agencies, will address a high priority research gap. Select examples of effects of interest that will be identified in the RFA include: 1) reduced fertility in exposed human males and females, 2) pregnancy outcomes of exposed human females, and 3) hormonally mediated cancers of the reproductive tract in human male and female offspring exposed in utero. Research supported under the EDC program will be awarded through a competitive peer-review process. The EDC increase will improve the Agency's ability to deal with major human health threats posed by EDCs.
- (+\$1,991,100, -2.0 workyears) This enhancement will support efforts under the graduate fellowship program and the Minority Institutions Assistance (MIA) fellowship program. The graduate and MIA fellowship programs will award fellowships to deserving students studying environmental sciences/engineering at accredited institutions of higher learning. Awards under the fellowship programs will be made on the basis of rigorous competitive evaluation. These fellowships will position the Agency to meet its future scientific workforce and diversity goals.

- (+\$2,885,000, + 7.0 workyears) This increase represents a technical realignment of resources from the core research program under Sound Science Pollution Prevention, (Goal 8, object 4), to consolidate mercury research in one place. This research will improve the Agency's understanding of the problems posed by mercury releases into the environment. There is no programmatic impact and no impact on performance commitments.
- (-\$2,315,500) The 2001 request is \$2,315,500 below the 2000 Enacted budget level due to Congressional earmarks received during the appropriations process that are not part of the 2001 President's Request.
- (\$1,117,100, -0.7 workyears) The R&D program, including infrastructure support costs, is spread across eight of the ten goals in the Agency's GPRA/budget structure. Based on a review of actual infrastructure utilization under each goal (i.e., utilization of workyears and associated PC&B, travel, operating expenses, and working capital fund), adjustments are being made across goals to more accurately reflect expectations for use in FY 2001.

EPM

- (+\$114,000) Reflects increased payroll costs.

**Annual Performance Goals and Performance Measures**

**Research on Endocrine Disrupting Chemicals**

- In 2003 Develop tools to identify and characterize hazards, conduct initial assessments, and formulate preliminary strategies to manage risks from exposure to endocrine disrupting chemicals capable of inducing adverse effects on humans and wildlife.
- In 2000 Develop tools to identify hazards and formulate strategies to manage risks from exposure to endocrine disrupting chemicals capable of inducing adverse effects in humans and wildlife.
- In 1999 Completed a protocol for a field exposure study of children to two (2) endocrine disrupting chemicals (EDCs), which will help reduce uncertainties about actual exposure to EDCs.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request
Produce workshop report on the EDSTAC screening process for EDCs and determine application of the EDSTAC testing program for chemical hazard and risk assessment.		1	report
Characterization of environmental agents as risk factors in human prostate cancer.		1	characterizat'n
Reports on endocrine and other effects in exposed women and their offspring in a cohort contaminated by PBBs.		2	report
Reports on the molecular mechanisms underlying estrogen receptor functions in ER knockout mice.		2	report

Development and refinement of test methods for use in Tier 1 testing of potential EDCs	2	methods
Development of amphibian assay for use in hazard identification.	1	assay
Protocol for field exposure study of children to 2 EDC's		
Provide prototypical mechanism-based methods for assessing the risk of developmental and reproductive toxicants using amphibian and small fish models.		9/30/01 methods

Baseline: In order to address uncertainties with regard to whether endocrine disrupting chemicals are having adverse impacts on wildlife and humans, we must increase our ability to detect their activity at various levels of biological organization, as well as across species. As pointed out in EPA publications, as well as the most recent NAS report on Hormonally Active Agents, there are large gaps in our current science regarding the nature, significance, and magnitude of the endocrine disruptor issue. In the short term, we need to develop and validate specific tests of endocrine activity to support implementation of the screening and testing requirements of the FQPA as recommended by the EDSTAC. We must also must bring more focus to addressing questions of the risk assessment approaches to endocrine active compounds, especially in relationship to endogenous hormone levels, exposure to multiple endocrine disruptors, and the key life stages that are at greatest risk. In the longer term, we need to identify the critical sources and fates of endocrine disruptors that are deemed to be of highest concern on the basis of their biological effects, and to develop technologies or approaches to mitigating those exposures.

**Mercury Research**

- In 2001 Provide recommendations both about revising, if needed, EPA's reference dose (RfD) for methylmercury and for managing risks from environmental exposures to mercury.
- In 2000 Initiate a research program to address the most pressing issues related to the prevention, control, and elimination of mercury as a human health and environmental problem.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Provide a mercury research plan to act as guide in the execution of an ORD-based mercury research program.		1		plan
Publish results of bench and pilot testing aimed at identifying improved sorbents for mercury mitigation from coal-fired utility boilers.			1	publication
Make recommendations, as appropriate, for revision of EPA's RfD for methylmercury based on analysis of the National Academy of Sciences report on mercury.			9/30/01	recommend.

Baseline: The most up-to-date scientific and technical information on risk assessment and risk management of mercury was presented in the Mercury Study Report to Congress (December 1997). That report demonstrated a plausible link between mercury emissions and effects caused by the eventual uptake by humans via fish consumption. At the same time, the National Academy of Sciences has undertaken a review of research describing adverse effects of methylmercury on human health (especially as these exposures affect development of the nervous system) and the kinetics of mercury in the human body. The evaluation of these data by the NAS committee will be used in a reassessment of EPA's Reference Dose

(RfD) for methylmercury. ORD is supporting a research program to address several research questions that need to be answered with respect to mercury. Three of the most important research needs that will be addressed over the next two years are: (1) identifying human exposures to methylmercury in the US and determining how close these are to levels of mercury that adversely impact human health, especially for women of child-bearing age and very young children; (2) developing an improved understanding of the emissions and releases of mercury into the environment; and (3) providing additional data on the costs and benefits associated with various control technologies and approaches for minimizing and reducing mercury emissions.

## **Coordination with Other Agencies**

The broad nature of the EDCs issue necessitates a coordinated effort on both the national and international level. EPA's Office of Research and Development (ORD) has shown extensive leadership at both levels - chairing the Committee on Environment and Natural Resources (CENR) interagency working group and serving on the IPCS/OECD Steering Group on Endocrine Disruptors.

Under EPA's leadership an inventory of federal research on endocrine disruption has been developed and used to evaluate the current state of the federal effort, identify research gaps and establish priorities, and clarify governmental roles and responsibilities. To date, nearly 400 projects have been identified as being sponsored by the participating 14 agencies. Due to the complex nature of the uncertainties posed by the endocrine disruptor hypothesis, 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 development of their own independent research plans. Therefore, an important component of EPA's Research Strategy on Endocrine Disruptors is to communicate with other federal organizations on EPA's goals, priorities, and projected accomplishments.

In conjunction with the CENR effort, a companion effort to inventory research has been conducted in Europe and efforts are currently underway under the auspices of the World Health Organization's International Programme on Chemical Safety (IPCS) and the Organization of Economic and Cooperative Development (OECD) to assemble an international inventory and assessment of the endocrine disruptor issue. Once again, EPA is demonstrating leadership in helping establish the international inventory.

A critical aspect of mercury research involves pollution prevention. Progress has been made in organizing the concepts and ideals of pollution prevention in the private sector, but much work remains to be completed. As a result, EPA is in a unique position to focus Federal pollution prevention investments in this critical areas. The agency through partnerships with private sector companies, non-profits, other Federal agencies (such as DOE), universities and states, including California EPA has labored to identify and control human exposure to methylmercury.

For economics, the Agency will continue to support jointly sponsored economic workshops with other regulatory agencies, such as efforts underway with the Food and Drug Administration and Department of Agriculture, to address the economic valuation of human health effects. The Agency and ORD's workshops on economics and environmental policy will continue to draw upon

EPA's sponsored economic research, facilitating information exchanges among academic and federal regulatory agency representatives.

**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

TSCA sections 4, 5, and 6 (15 U.S.C. 2603, 2604, and 2605)

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

SDWA section 1412 (42 U.S.C. 210, 300g-1)

RCRA/HSWA: (33 U.S.C. 40(IV)(2761), 42 U.S.C. 82(VIII)(6981-6983))

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

CERCLA: 42 U.S.C. 103(III)(9651)

PPA (42 U.S.C. 13101-13109)

Federal Technology Transfer Act

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risks, and Greater Innovation to Address Environmental Problems

##### Objective # 4: Pollution Prevention and New Technology

By 2006, 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.

##### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Pollution Prevention and New Technology for Environmental Protections</b>	<b>\$68,385.2</b>	<b>\$68,172.4</b>	<b>\$52,564.4</b>	<b>(\$15,608.0)</b>
Environmental Program & Management	\$877.7	\$5,105.3	\$5,527.5	\$422.2
Science & Technology	\$67,507.5	\$62,802.1	\$45,698.3	(\$17,103.8)
Hazardous Substance Superfund	\$0.0	\$265.0	\$1,338.6	\$1,073.6
Total Workyears	169.3	206.1	198.0	(8.1)

##### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Common Sense Initiative	\$867.0	\$630.4	\$641.8
Environmental Technology Verification (ETV)	\$6,908.5	\$6,392.6	\$6,699.5
Pollution Prevention Tools and Technologies	\$30,509.5	\$27,442.0	\$19,469.3
Rent, Utilities and Security	\$0.0	\$4,001.1	\$4,414.2
Administrative Services	\$0.0	\$839.0	\$890.1

## **FY 2001 Request**

EPA supports pollution prevention (P2) as a necessary and logical strategy for dealing with high-risk human health and environmental problems that are addressed by Federal environmental, health, and safety regulations. In order to promote decisions which place pollution prevention as the first solution among many, research must focus on the development of tools and technologies that are more quantitative and easier for stakeholders and decision-makers to use than those currently available.

To promote environmentally benign technology, research is needed to identify and test new industrial manufacturing and processing technologies capable of enhancing productivity without sacrificing long-term resource viability or increasing human health and/or environmental risk. Several areas of research contributing to the achievement of the annual performance goals are: 1) pollution prevention tools, methods, technologies, and approaches; 2) environmental technology verification (ETV); and 3) environmental engineering economics (E3).

Pollution prevention tools and technologies must meet the needs of stakeholders and decision makers, must be easy to understand and use. Attributes of these tools must include an ability to: (1) fully characterize and compare the environmental and human health impacts of alternative approaches or products and processes, (2) describe and track the risks which stem from production and consumption decisions, and (3) quantify and measure the benefits derived from those decisions. Coupled with the development of this new generation of tools and technologies, there must be an explicit recognition that pollution prevention will play an important role in environmental sustainability well into the future (such as life cycle assessment). A life cycle assessment (LCA) studies the environmental consequences throughout the life span of a product, process or activity (i.e., from “cradle to grave”), from raw material acquisition, through manufacturing, use-reuse and final disposal. It assesses the potential environmental impacts by compiling an inventory of relevant inputs and outputs (including resource and energy use and pollutant release) and evaluating the potential environmental impacts of those inputs and outputs.

Every effort must be made to extend pollution prevention and life cycle thinking into the arena of sustainable development where its benefits to human health and environmental risk management can be objectively understood and employed. This is particularly true as States, cities, and tribes increasingly make decisions on their environment at a community level.

The goal of the ETV program is to verify the performance characteristics of commercial-ready environmental technologies through the evaluation of objective and quality-assured data so that potential purchasers and permittees are provided with an independent and credible assessment of the technology that they are buying or permitting. With broad support from industry and other Federal partners, the ETV Program will continue to verify the environmental performance characteristics of technologies in all media (e.g., industrial pollution prevention, recycling and waste treatment; advanced air, water, and field monitoring technologies; air pollution control and greenhouse gas reduction technologies; drinking water, eco-system, and waste water systems) under its twelve pilots. In addition to supporting these twelve ETV pilots, the Agency will collect data on operational parameters (e.g., number of participants; cost and time required to perform tests and

report results), and on outcomes (e.g., use of data by the states and public; sales reported by vendors) in order to evaluate all aspects of the ETV Program.

Established in 1995, ETV has verified 55 environmental technologies and 105 are currently in testing. EPA will use this information to make long term recommendations to the Congress on the future and shape of the ETV Program. Finally, the Agency will track applications and expressions of interest on the part of technology developers who come to the Program, but do not fit into the present suite of verification activities. EPA will continue to enhance the ETV Program outreach efforts through the ETV Web site, national conference(s)/workshop(s) and State permitter training. There will be a regular review of the outreach strategy to assure effective diffusion of ETV program information. In 2001, the Agency will prepare a report for Congress which will evaluate the results of the first five years of the ETV program.

Environmental Engineering Economics (E3), including cost-effectiveness analysis, has the potential to not only promote pollution prevention, but also to guide investments in new technologies and approaches and improve regulatory impact analysis capabilities. Estimation of the costs of reducing environmental effects, while generally thought to be straightforward, is at least as challenging as estimation of the benefits. Internally, the Agency is funding economic studies under various important environmental and human health risk management topics. To address the issue of benefits, the Agency's Science to Achieve Results (STAR) grants program is funding a solicitation on Decision-making and Valuation for Environmental Policy competition. This competition encourages research that will contribute to the development of practical, credible approaches for estimating the benefits and costs of environmental programs and improve decision-making on environmental issues.

As pollution prevention implementation has advanced in the past ten years, many of the problems most easily addressed by using a preventive approach have been solved. One area that is particularly challenging relates to persistent, bioaccumulative toxics (PBTs). A major Agency effort is underway (i.e., the PBT Initiative via the Great Lakes Binational Toxics Strategy and the Agency's Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic Pollutants) to address this set of problematic chemicals. In support of the PBT Initiative goal of prevention, minimization, and, when possible, elimination of PBTs, the Agency will make a number of contributions to the above strategies in FY 2001 that will be focused on improvements to, and development of, better methods for identification, testing, and prevention of PBTs across the board, and as appropriate, will target specific PBTs (e.g., mercury, dioxin, PCBs) for intense attention in support of Program Office and Regional needs. Four focus areas have been identified for attention with respect to PBTs: (1) transport and fate, (2) targeted risk management, (3) monitoring and methods development, and (4) science workshops.

In the risk assessment area, risk assessors and risk managers will develop tools and methodologies which are meaningful and understandable to the public in terms of the costs and benefits associated with the magnitude of the risk that is identified. This is a long-term effort that will require the development and improvement of quantitative risk assessment and cost/benefit analysis or similar tools. Together, these tools will provide a more robust and reliable means of making decisions on human health and environmental risks. The Agency will develop tools and



methodologies to scientifically and systematically assist in making more quantitative decisions about the most preferred pollution prevention options. The types of research to be included are: 1) improving life cycle assessment (LCA) tools; 2) developing and enhancing computerized databases on less-polluting alternatives; and 3) developing cost assessment and benefit/cost analysis methodologies.

The Agency will also target a number of economic sectors in concert with EPA's Program Offices and regions where research and development is needed on pollution prevention technologies and approaches. The types of research to be conducted include: (1) developing improved separations techniques for the removal and reuse of chemicals; (2) assessing and evaluating alternatives to volatile organic compounds (VOCs) in solvents and coatings; (3) assessing and evaluating reductions in releases of halogenated compounds and metals (e.g., persistent, bioaccumulative, and toxic materials) in processing and use; (4) assessing releases associated with consumer products in an indoor environment; (5) improving process controls to reduce wastes; (6) examining and developing green chemistry and green engineering approaches to prevent pollution; and (7) supporting Agency-wide initiatives in pollution prevention (e.g., Sector Initiative, PBT Initiative).

The Agency's STAR grants program will maintain a portfolio of pollution prevention and valuation research. This portfolio of research grants is focused in four areas for pollution prevention: (1) engineering for pollution prevention; (2) green chemistry; (3) pollution prevention simulations, modeling, sensors and feedback; and (4) industrial ecology. Topics covered include solvent substitution, bioengineering, improved catalysis for pollution prevention, benign chemical reactions, green design, modified processes, and materials recycle and reuse for pollution prevention. This portfolio of research grants is also focused on two areas for valuation; (1) the relationship between the economy and the environment; and (2) environmental decision-making.

This research program is also supported through the Agency's Postdoctoral Initiative. The FY 2001 request is the third year of the effort to enhance our intramural research program by supporting 3.7 additional postdoctoral positions under this objective. This enhancement continues to build upon the positive response by the academic community to EPA's announcement of 50 postdoctoral positions for 1999.

## **FY 2001 Change from FY 2000 Enacted**

### S&T

- (-\$3,504,000, -7.0 FTE) This reduction represents a technical realignment of mercury risk management and risk assessment research resources transferred from Goal 8, Objective 4, to Goal 8, Objective 3. There is no programmatic impact nor change in performance expectations.
- (-\$1,811,800, -6.0 FTE) In order to fund higher priority research, the Agency will reduce efforts in its pollution prevention program. This reduction will reduce the Agency's effort in environmental engineering economics (E3) and new efforts in the areas of environmental benefits and valuation, particularly in the areas of new processes, products, and materials to eliminate VOCs and other hazardous air emissions in small- and medium-sized businesses.
- (-\$5,100,900) This reduction relates to the change in resources set-aside for the Small Business Innovative Research (SBIR) program from its 2000 level. Final funding level for the SBIR program in FY 2001 will be fully funded during the operating plan process.
- (-\$8,613,900) The 2001 request is \$8,613,900 below the 2000 enacted budget level due to Congressional earmarks received during the appropriations process that are not part of the 2001 President's Request.
- (+\$1,104,400) Additional resources provided towards creating a more comprehensive and clear understanding of data quality, and what its impact to all aspects of our environmental and public health mission.

## **Annual Performance Goals and Performance Measures**

### **Pollution Prevention Tools and Methodologies**

- |         |   |
|---------|---|
| In 2001 | Work under this APG is proceeding according to schedule.  |
| In 2001 | Prepare and deliver pollution prevention tools and methodologies for multiple economic sectors in order to enhance a preventive approach to risk management and advance the use of pollution prevention and sustainable development.  |
| In 2000 | Provide decision-support tools and methods which can be applied to determine the value and costs of solutions to environmental problems, and develop partnerships to assist in the application of these tools and methods to community-based environmental programs including tribal partners.    |
| In 2000 | Complete development of one or more computer-based tools which simulate product, process, or system design changes, and complete proof-of-process structure for one or more generic technologies (appl. to >1 env. problem) to prevent or reduce pollution in chemicals and industrial processes. |

In 1999 Completed a draft prototype decision support tool for alternative municipal solid waste management.

Performance Measures:

FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request
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Complete prototype decision support software for alternative municipal solid waste management options.

Complete dev. of the PARIS II Software, a tool to design env. benign solvents, & complete dev. & integration of WAR Algorithm, v 1.0, into a commercially available chemical process simulator

09/30/2000 software

Complete BETA testing of decision support tool for life cycle analysis of municipal solid waste management options.

09/30/2000 tool

Provide an upgraded & enhanced Solvents Alternatives Guide (SAGE) software (expert) to incl. cost algorithms, giving it cost projection capability to complement its process selection capability

09/30/2000 software

Integrate the process change/waste reduction algorithm (WAR) with costing software (Icarus) and a chemical process simulation package (Aspen).

1 package

Complete a decision support tool for life cycle analysis of municipal solid waste management options.

1 tool & report

Publish a peer-reviewed protocol for conducting Risk Management Evaluations.

1 protocol

Complete grant on development of tool for predicting biodegradability of compounds.

1 grant report

Baseline: By 2003, provide a full range of multimedia pollution prevention decision-support tools to regional, state, tribal and community decision-makers.

**New Technologies**

In 2001 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.

In 2000 Use of a pilot program to verify environmental technologies.

In 1999 Goal exceeded by three verifications for a total of 53 completed verification reports; 98 additional technologies in process and 202 applications pending; 65 protocols and generic test plans developed; 724 stakeholders in 15 stakeholder groups attended 32 stakeholder meetings.

Performance Measures:

FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request
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Provide verification data on 50 or more technologies.

Complete test protocols for all 12 ETV pilots will be available.

09/30/2000

protocols

Verify 125 technologies.

125

technologies

Deliver a Report to Congress on the status and effectiveness of the Environmental Technology Verification (ETV) Program during its first five years.

1

report

Complete performance evaluations of various metal finishing processes aimed at zero-discharge metal pretreatment as replacements for more hazardous processes.

1

report

Complete a capstone report summarizing current knowledge about volatile organic compounds and hazardous air pollutants emissions from paints used indoors.

1

report

Develop new process for drycleaning microelectronic wafers to decrease water usage and toxic chemicals.

1

grant report

Baseline: There has been no consistent basis for comparing effectiveness and costs of new pollution prevention and control technologies to those of technologies currently in use. EPA is accumulating data on performance and costs of environmental pollution prevention and control technologies which will serve as a basis for the Agency as well as those outside EPA to evaluate and compare effectiveness and costs of technologies developed.

## **Verification and Validation of Performance Measures**

### **Goal 8 Objective 4**

**Performance Measure: Deliver a report to Congress on the status and effectiveness of the Environmental Technology Verification (ETV) Program during its first five years.**

**Performance Database:** Output

**Data Source:** N/A

**QA/QC Procedures:** N/A

**Data Quality Review:** N/A

**Data Limitations:** N/A

**New/Improved Data or Systems:** N/A

## **Coordination with Other Agencies**

Pollution prevention, environmental technology verification (ETV), and environmental engineering economics (E3) are all research areas that lend themselves to and benefit from engagement with other federal organizations, states, and local organizations. EPA has worked over the years with the National Science Foundation (NSF) in co-funding extramural research on technology for a sustainable environment and environmental valuation. The Agency 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 life cycle thinking in addressing the production and manufacture of weapons and military hardware. With respect to ETV, the Agency has co-funded efforts on monitoring technology evaluation with the Department of Energy's (DOE's) Sandia and Oak Ridge National Laboratories. Just recently, EPA signed a Memorandum of Agreement with DOD to jointly advance ETV and DoD's Environmental Science and Technology Evaluation Program for evaluating and verifying environmental technologies.

Preliminary contacts have been made with the Department of Agriculture (USDA) regarding life cycle analysis and a preventive approach in the development and advancement of biologically and genetically altered products. DoD's U. S. Army Corps of Engineers has been engaged in addressing issues related to costs of engineered projects and research associated with benefits and costs of technologies and projects. Finally, under the PBT Initiative, EPA has been working with DOE and the U. S. Geological Survey to address risk management issues associated with mercury emissions from utilities. These efforts are expected to expand with the implementation of the Mercury Research Strategy in FY 2001 under Goal 8, Objective 3.

All of the above activities leave EPA in a unique position to focus Federal pollution prevention investments because: (1) it is the only Federal research organization with the broad mission to ensure that pollution prevention provides maximum human health and environmental protection, and (2) it has direct links to the regulatory and compliance offices of EPA to ensure a focus on the highest priority problems. For example, one area of particular interest amenable to federal, state, and local engagement is environmental sustainability. The Agency is exploring how best to engage in a multi-organizational effort to advance research on sustainability over the next several years through collaboration with such organizations as the National Governors Association, the Environmental Commission of the States, and the National Association of Local Government Environmental Professionals. This engagement would be done in close cooperation with other federal organizations and the appropriate programs and regions within EPA.

## **Statutory Authority**

Clean Air Act  
The Safe Drinking Water Act  
The Clean Water Act  
The Toxic Substances Control Act  
The Federal Insecticide, Fungicide, and Rodenticide Act  
The Resources Conservation and Recovery Act  
Superfund Amendments Reauthorization Act

Clean Air Act Amendments of 1990  
Pollution Prevention Act of 1990

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems

##### Objective # 6: Increase Use of Integrated, Holistic, Partnership Approaches

By 2005, EPA will increase the number of places using integrated, holistic, partnership approaches, such as community-based environmental protection (CBEP), and quantify their tangible and sustainable environmental results in places where EPA is directly involved.

##### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Increase Use of Integrated, Holistic, Partnership Approaches</b>	<b>\$16,706.6</b>	<b>\$9,286.8</b>	<b>\$17,088.5</b>	<b>\$7,801.7</b>
Environmental Program & Management	\$16,706.6	\$9,286.8	\$17,088.5	\$7,801.7
Total Workyears	24.4	8.9	8.5	(0.4)

##### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Innovative Community Partnership Program	\$4,701.8	\$309.8	\$4,841.5
Regional Geographic Program	\$8,070.6	\$11,989.8	\$12,193.1

##### FY 2001 Request

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 Regions also

provide direct assistance to communities to assist them in environmental programs. 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. In 2001, EPA will continue to strengthen local and intergovernmental partnerships to address risks to human health and ecosystems that provide goods and services to our communities. Specifically, EPA will provide assistance to communities to help them identify the integrated set of environmental issues within a place-boundary and strategies to address interconnected issues with appropriate regulatory and non-regulatory tools. EPA will also provide tools and information to build better stakeholder involvement and to assist communities in conducting assessments of environmental issues and the analysis of options for resolution that address communities' economic and social concerns.

The Regional Geographic Initiatives (RGI) program works with local communities and other partners to apply state-of-the-art, multi-media approaches to their unique human and environmental risks. The RGI program provides flexibility for the EPA Regional offices to partner with communities at the state, local, and private levels to collaboratively achieve environmental results. The projects address geographic environmental problems that have proven to be high risk to human health and ecosystems. The RGI program is different from other traditional EPA programs in that RGI addresses community based environmental risk holistically (multi-media). This program uses comparative environmental risk assessments to implement unique and creative multi-media solutions and promotes state-of-the-art environmental management. RGI is EPA's role model transitioning from a single-media to a multi-media focus, based on consensus-building, science and risk.

The Innovative Community Partnership Program is a nationally competitive grants program. The grants act as seed money to leverage public and private investment in innovative, locally-developed solutions to serious environmental problems which EPA has a mandate to address. Successful projects must integrate environmental protection, economic vitality, and community well-being and meet stringent criteria related to innovation, replicability, community commitment, and measurable results.

#### **FY 2001 Change from FY 2000 Enacted**

##### **EPM**

- (+\$4,841,500) Reflects support for the Agency's Innovative Community Partnership Program.
- (+\$3,840,400) Reflects restoration of RGI activities that were cut in 2000.
- (-\$229,200, -2.8 FTE) Reflects reduced support for CBEP initiatives.
- (-\$600,000) Resources are not provided for Congressional earmarks.



## **Statutory Authorities**

Multi-media

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems

#### Objective # 7: Increase Opportunities for Sector Based Approaches

By 2005, test innovative facility- and sector-based strategies to achieve improved environmental protection, and make successful approaches broadly available.

#### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Increase Opportunities for Sector Based Approaches</b>	\$20,762.2	\$19,703.4	\$15,921.3	(\$3,782.1)
Environmental Program & Management	\$19,862.2	\$18,325.9	\$15,921.3	(\$2,404.6)
Science & Technology	\$900.0	\$1,377.5	\$0.0	(\$1,377.5)
Total Workyears	98.2	97.8	110.5	12.7

#### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Urban Environmental Quality and Human Health	\$0.0	\$0.0	\$3,395.0
Project XL	\$3,359.9	\$1,750.5	\$1,791.6
Common Sense Initiative	\$3,812.5	\$1,016.4	\$2,840.4
Reinvention Programs, Development and Coordination	\$0.0	\$8,217.5	\$9,218.6
Administrative Services	\$0.0	\$110.6	\$120.5

## **FY 2001 Request**

In order to reform the regulatory system to achieve better results at less cost, without sacrificing public health or environmental protection, EPA will pursue a program focused on sectors, facility-based pilots, small business, performance incentives, and communities. These initiatives stem from the commitments in the March 1995 Reinventing Environmental Regulation report issued by President Clinton and Vice President Gore. EPA's priorities for innovation were updated and refocused in the July 1999 report of the EPA Innovations Task Force, "Aiming for Excellence: Actions to Encourage Stewardship and Accelerate Environmental Progress." In the course of this work, the Agency works closely with states, tribes, and local governments, and pays particular attention to the needs of small and medium-sized businesses.

In FY2001, EPA will complete its transition from the Common Sense Initiative (CSI), the agency's initial multi-stakeholder, industry sector-focused effort to a permanent, integrated sector-based approach to environmental protection. The Agency will continue experimenting with innovative facility-based projects to pilot alternative environmental management strategies that achieve improved, more cost-effective performance in lieu of otherwise applicable rules and regulations.

Project XL, launched in 1995, was designed to improve EPA's ability to innovate and incorporate flexible approaches that result in environmental improvement and reduced cost. In FY 2001, EPA will move Project XL (50 projects expected to be implemented in FY 2000) to the next phase that expands EPA's ability to conduct innovative policy experiments that provide superior environmental performance, test flexible approaches, and lead to policy, programmatic and regulatory improvements. This next phase will include: 1) managing ongoing XL pilot projects; 2) evaluating the project results for their environmental and economic benefits and their applicability to policy and regulatory improvements; 3) incorporating the applicable policy and regulatory improvements into EPA's core functions including regulations, permitting, monitoring and reporting requirements, and other areas; 4) working with states to implement innovative pilots that require Federal flexibility under the ECOS-EPA Innovations agreement; and, 5) implementing additional innovative pilots that address opportunities identified by EPA, the business community and other stakeholders.

Sector strategies complement current EPA activities by allowing the Agency to approach issues more holistically, with integrated strategies for each industry sector. Sector-based approaches also enable EPA to 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.

In 2001, the Agency will extend its sector-based programs by building consideration of sector-specific applications into the development of regulations and policy/guidance documents. It will continue to expand its work with specific sectors, particularly those characterized by a high concentration of small businesses. EPA will continue implementation and expansion of the Metal Finishing Strategic Goals Program, and will pursue similar performance partnership programs with other industry sectors, starting with the Foundry and Casting sector and the Meat Processing sector. EPA will work with additional sectors using the Sustainable Industry process to develop incentives, create tools, test innovative ideas, and remove barriers to improved environmental performance with reduced regulatory burden. In 2001, the

Agency will complete its Sustainable Industry work with the Shipbuilding/Ship Repair and Specialty-Batch Chemical industry sectors, and will identify several new industry partners for that sector process.

In the process of developing sectoral 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. While EPA continues to rely on standard setting, permitting and enforcement, these traditional tools are now often augmented by compliance assurance, voluntary programs, stakeholder involvement and many new sector-based processes and programs designed to ensure quicker or more effective results. In support of these strategies, EPA will continue to implement projects that offer flexibility or other benefits to test innovative approaches to environmental protection.

In 2001, the Agency will create a more comprehensive program that addresses the unique and diverse needs of the small business community, which includes manufacturing, high tech industry, and the service sector. We will build on our recent successes and continue to work with the small business community to develop new tools, and explore incentive approaches that are tailored, information rich, and are key to a company's bottom line and improved performance. The Agency will support the integration of small business assistance and policy innovation efforts with the program offices, and explore more creative ways to deal with compliance assistance and enforcement. We will work with program offices to streamline and coordinate Agency efforts to provide more reliable environmental information to existing state assistance providers and to small businesses.

The Agency will continue to take a leadership role in addressing issues that affect broad sectors of the economy. The Agency will continue to promote positive changes in sectors that affect community environmental quality through the development of analytic tools and the collaborative exchange of information. These tools assist local governments in integrating their environmental goals with other goals associated with conservation, development and growth.

Finally, the Agency will more effectively integrate and manage EPA's resources and efforts that are currently available for promoting environmental quality at the community level. The Agency will work to ensure that those communities pursuing development strategies that incorporate environmental quality considerations receive appropriate credit under the Agency's core program areas - air quality, water quality, waste management. Under this goal, the Agency will focus on improving environmental quality by: (1) removing barriers and creating incentives for environmentally beneficial development; (2) developing tools and technical assistance (e.g., the Smart Growth Index); (3) leveraging EPA's resources to provide and disseminate information (e.g., through web sites and publications); (4) forming multi-disciplinary, multi-lateral partnerships among public and private sector stakeholders; and (5) identifying and conducting research related to environmental quality impacts associated with development patterns and practices.

In response to a large and growing number of requests from states to help them address the environmental issues associated with growth and development, we have increased our activities under urban sprawl. We will integrate smart growth approaches to environmental quality and voluntary smart growth programs within key program offices and regional offices. In response to their requests, we will help states and local governments achieve their environmental goals, using smart growth approaches. We will also develop regulatory incentives that will encourage redevelopment within metropolitan areas and

help preserve watersheds, open space, and habitats on edge. These incentives will also encourage more environmentally-friendly development in rural areas.

**FY 2001 Change from FY 2000 Enacted**

**MULTI-APPROP**

- (-\$5,750,000 EPM, -\$1,450,000 S&T) Resources are not provided for Congressional earmarks.

**EPM**

- (+\$3,373,000, +5.1 FTE) Reflects support for the Urban Sprawl initiative. This program was transferred from the Office of Congressional and Intergovernmental Relations (Goal 7, Objective 3) to the new Office of Policy, Economics, and Innovation (Goal 8, Objective 7).
- (+\$490,200, +2.0 FTE) Reflects support for Sectors work.
- (+\$214,000) Reflects increased workforce costs.

**Annual Performance Goals and Performance Measures**

**CSI/Project XL**

- In 2001 EPA will develop the next phase program for identifying, implementing & evaluating pilot projects based on the Project XL pilot program.
- In 2000 All 50 Project XL projects will be in implementation
- In 1999 In FY1999, EPA signed 5 new XL Agreements, bringing the number of projects in implementation to 15. An additional 36 XL proposals were either under development or in negotiation. Thus, 51 XL projects were being implemented or developed in FY1999.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Number of Project XL projects in implementation or development	51	50		projects
Transition Project XL to next phase pilot program			1	strategy
Baseline:	Initial strategy will be developed in FY 2001.			

## **Statutory Authorities**

National Environmental Policy Act

The Economy Act of 1932

TSCA sections 4, 5, and 6 (15 U.S.C. 2603, 2604, and 2605)

PPA (42 U.S.C. 13101-13109)

CWA

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems

##### Objective # 8: Regional Enhancement of Ability to Quantify Environmental Outcomes

By 2005, Regions will have demonstrated capability to assess environmental conditions in their Region, compare the relative risk of health and ecological problems, and assess the environmental effectiveness of management action in priority geographic areas.

##### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Regional Enhancement of Ability to Quantify Environmental Outcomes</b>	<b>\$6,732.0</b>	<b>\$6,089.0</b>	<b>\$7,756.8</b>	<b>\$1,667.8</b>
Environmental Program & Management	\$3,599.1	\$2,948.8	\$4,328.3	\$1,379.5
Hazardous Substance Superfund	\$3,132.9	\$3,140.2	\$3,428.5	\$288.3
Total Workyears	9.2	5.5	4.1	(1.4)

##### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Regional Science and Technology	\$5,951.7	\$6,111.3	\$7,156.8

## **FY 2001 Request**

The Regional Science and Technology (RS&T) Program supports the Agency's overall mission to protect human health and safeguard the natural environment by providing a sound science foundation upon which to base its decisions.

The role of RS&T in implementing this goal is to continue to provide field sampling, analytical and data management support, including quality assurance to base program needs operating within the regions before and after implementation of statutory mandates, community-based environmental protection, sector-based and geographically targeted initiatives.

“Centers of Applied Science” have been established to develop sampling, quality assurance and analytical methods to support assessment of emerging environmental issues. This will include the development and application of new and innovative technologies such as toxic and ambient air analyses for the national PAMS program states' air monitoring programs, alternative methods for organic extraction techniques to reduce or eliminate the quantity or toxicity of waste, trace level dioxin/furan analyses, new methods for the identification and quantification of microbial contaminants (*Cryptosporidium* and *Giardia*) and trace level PCB congeners in sediment matrices. These methods and technologies will be shared within EPA and with partner agencies.

Data and information management systems will be in place, including data quality indicators, that will enable EPA and partner agencies to locate, assess and share environmental data for their program needs. The RS&T Program will continue to build capacity and support partner agencies by providing technical and analytical support in the assessment of environmental problems, and by converting environmental data into useful decision-making information.

## **FY 2001 Change from FY 2000 Enacted**

### **MULTI-APPROP**

- (+\$1,479,500 EPM, +\$288,300 SF) Reflects restoration of support for the Environmental Service Division laboratories.

### **EPM**

- (-\$100,000, -1.4 FTE) Reflects decreased emphasis in regional activities under this objective

## **Statutory Authorities**

Multi-media



## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems

##### Objective # 9: Science Advisory Board Peer Review

Conduct peer reviews and provide guidance on the science underlying Agency decisions.

##### Resource Summary (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
Science Advisory Board Peer Review	\$2,486.7	\$2,861.7	\$2,674.0	(\$187.7)
Environmental Program & Management	\$2,486.7	\$2,861.7	\$2,674.0	(\$187.7)
Total Workyears	22.5	22.5	22.5	0.0

##### Key Programs (Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	
Science Advisory Board		\$0.0	\$2,860.6	\$2,674.0

##### FY 2001 Request

The Science Advisory Board (SAB) plans to maintain the level and quality of its peer review activities to support the Agency by selecting issues for review that best meet the criteria for SAB review; i.e, those that impact on 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.

In addition, the SAB will expand its efforts to incorporate the technical aspects of economics and other social sciences into environmental decision making and to find the best ways to integrate

science considerations into the Agency's new ways of doing business (e.g., place-based and sector-based).

For many years the SAB's goal 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 100 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 technical views from academia, communities, states, independent research institutions, and industry.

To truly make a positive difference in the production and use of science at EPA, the Board must do more than review Agency products from traditional line offices. It must help the Agency make strategic use of science. Science alone is insufficient for making environmental decisions, but it is impossible to protect human health and the environment without science.

Economic and other social science issues are particularly important now that EPA is experimenting with 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 the national standards. Therefore, the SAB will find effective ways for science to contribute to the Agency's new ways of doing business.

#### **FY 2001 Change from FY 2000 Enacted**

EPM

- (-\$187,800) Reflects a recalculation of payroll costs.

#### **Coordination with Other Agencies**

The Science Advisory Board (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 ORD Board of Scientific Counselors (BOSC), the FIFRA Scientific Advisory Pane (SAP), and the Children's Health Protection Advisory Committee participate in the quarterly meetings of the SAB Executive Committee (EC) 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 Board 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 a various levels of government -- from the local level to the international level.

**Statutory Authorities**

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

## Environmental Protection Agency

### FY 2001 Annual Performance Plan and Congressional Justification

#### Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems

##### Objective # 10: Incorporate Innovative Approaches to Environmental Management

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 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
<b>Incorporate Innovative Approaches to Environmental Management</b>	<b>\$4,056.9</b>	<b>\$4,210.7</b>	<b>\$4,940.4</b>	<b>\$729.7</b>
Environmental Program & Management	\$4,056.9	\$4,210.7	\$4,940.4	\$729.7
Total Workyears	20.3	22.7	22.7	0.0

#### Key Programs

(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Reinvention Programs, Development and Coordination	\$4,334.1	\$4,146.9	\$4,868.8

#### FY 2001 Request

Reinvention has been a broad-based, Agency-wide strategy for achieving cleaner, cheaper, smarter results from environmental programs. By rethinking problems and the solutions typically used to solve them, reinvention engages Agency managers and staff, as well as external stakeholders, in finding better ways of doing business without imposing unnecessary costs and regulatory burdens. EPA has developed a dual strategy for reinventing environmental protection: (1) innovating and streamlining the current regulatory system (e.g., consolidate and simplify regulations and reporting requirements, and streamline permitting), and (2) designing and testing

integrative and holistic approaches (e.g., sector- and industry-based approaches, and community-based environmental protection, partnership programs). Through reinvention, EPA is implementing strategies that lead to better protection at less cost, and is moving beyond the single-media focus of the past to better address today's environmental challenges.

The Reinvention office will serve as a primary gateway for stakeholders/customers to use in interacting with EPA on reinvention and will define the vision, strategy, ground rules, and principles for reinvention by engaging stakeholders. The office will ensure new approaches are identified, designed, and piloted by program-specific approaches in other EPA offices and manage Agency-wide approaches in the Office of Reinvention. Integrating and coordinating new approaches across the Agency into a coherent strategy for change, tracking reinvention progress and evaluating reinvention success, and ensuring successful new approaches are incorporated into the way EPA does business will also be a focus of the Office of Reinvention.

With extensive input from its stakeholders, EPA refined and focused its reinvention agenda in July of 1999 in the report, "*Aiming for Excellence*." Two broad themes anchor that report: A EPA needs to do more to help organizations comply with the law; and EPA needs to encourage those who are willing and able to do more. (p. 4) The report commits EPA to ten Key Actions, including using incentives and voluntary partnerships more widely; promoting the use of environmental management systems; developing a performance track; helping communities with environmental problem-solving, and supporting states, tribes, and communities in finding local solutions to livability issues. The Agency has aligned its policy and reinvention capabilities to strengthen its ability to carry out these commitments and to bolster innovation across EPA.

In 2001, EPA will work to provide incentives and rewards to good environmental performers in the business community. A performance track program will be developed, so that those businesses that perform well are treated differently from those that do not. EPA will continue to pursue reforms in the permitting system and to develop policy on the role of environmental management systems in environmental regulation.

Using lessons learned from recent initiatives, EPA will undertake projects suggested by internal or external stakeholders that test ways to modify EPA's core programs to foster flexibility (in regulations, policy, and guidance) as incentives and to gain superior environmental performance.

Taken together with related work across the Agency, this approach is designed to promote a systematic process of experimentation, evaluation, and program change in response to the lessons learned from innovation.

**FY 2001 Change from FY 2000 Enacted**

EPM

- (+\$723,200) Reflects restoration of administrative and Working Capital Fund resources in the Office of Policy, Economics, and Innovation (formerly the Office of Reinvention).

**Statutory Authorities**

Multi-media