

FY2006 ORD EJ Action Plan

The mission of the Office of Research and Development (ORD) is to conduct leading-edge research and foster the sound use of science and technology to fulfill EPA's mission. This mission commits ORD to conduct its research in a way that will have a direct and meaningful impact on EPA's decisions and programs. ORD provides EPA, and all Americans, with scientific and technical information to inform decisions about risks to human health and the environment. ORD provides much of the scientific foundation for EPA's regulatory programs and decisions by assessing the state of the environment, identifying new issues of potential concern, and providing guidance and tools to customers and stakeholders.

ORD recognizes the role of science in supporting the protection of public health to be an extremely important one. Sound science is at the core of understanding and adequately addressing the needs of disproportionately affected communities – helping communities of concern, and all communities, make informed decisions about their health and well-being. ORD brings environmental justice concerns to bear, either directly or indirectly, through its research, expert advice, and leadership in the development of Agency science policies.

ORD has organized its research activities around significant environmental issues that support the Agency's regulatory and policy setting activities. Through coordinated efforts with EPA's Program and Regional offices, ORD links with environmental justice activities across the spectrum of Agency science. ORD is committed to conducting research that, while addressing major Agency issues, supports environmental justice concerns through focusing research activities in support of Agency environmental justice programs and/or conducting field studies in disproportionately affected communities.

An example of the utility of ORD research products is exhibited in the collaborative effort between ORD and Region IV. ORD developed national atmospheric models for mercury transport and deposition, and standard methods for measuring species of mercury in emissions. Partnering with regional scientists, ORD modified an aquatic model from lakes in the North-central US to the particular conditions of South Florida and the Everglades. This effort resulted in reduced mercury emissions from waste incinerators, and greatly reduced releases of mercury into the atmosphere of South Florida, in particular.

The attached matrix is organized following the EJ Action Plan format from the EPA Office of Environmental Justice (OEJ) and focuses on eight priorities developed by a committee of senior leaders from across the Agency. The matrix uses OEJ's definitions for the following terms to maintain consistency with other EJ Action Plans:

Goal - The five major goals identified in the EPA Strategic Plan 2003-2008 and the Cross Cutting Strategies.

Objectives - Any of the 8 national environmental justice priorities or other priorities identified by the Headquarters Program Office or Region to accomplish a goal.

Activity - Action undertaken in order to address an Objective

Output - What was accomplished under each Activity.

Outcome - description of the impacts resulting from an Activity

The eight Agency EJ priorities are (there is no priority listed for Goal 3):

- Goal 1: Clean Air and Global Climate Change
 - Objective 1: Reduction in number of asthma attacks
 - Objective 2: Reduce exposure to air toxics
- Goal 2: Clean and Safe Water
 - Objective 1: Safe fish/shellfish
 - Objective 2: Clean and safe drinking water
- Goal 4: Healthy Communities and Ecosystems
 - Objective 1: Reducing elevated blood lead levels
 - Objective 2: Collaborative problem-solving to address environmental justice issues
 - Objective 3: Revitalizing of brownfields and contaminated sites
- Goal 5: Compliance and Environmental Stewardship
 - Objective: Ensuring compliance
- Goal 6: Cross Cutting Strategies
 - Objective: Internal Capacity Building (*e.g.*, training, internal program management)

The matrix illustrates ORD’s approach to integrating environmental justice priorities within the context of our Multi-Year Plans (MYPs). The purpose of the MYPs is to provide a framework that integrates research across ORD's laboratories and centers and strategic goals in support of the Agency's mission. This approach promotes ORD's focus on the highest priority issues and provides coordination for achieving our stated long-term research goals. The MYPs identify long-term goals and present annual performance goals (APGs) and associated annual performance measures (APMs) for a planning window of approximately 5-10 years. MYPs foster the integration of strategic risk-based environmental protection and anticipation of future environmental issues by communicating our research approach and timing for responding to environmental issues. MYPs are intended to be living documents and are updated as needed to reflect the current state of the science, resource availability, and Agency priorities.

The “Activities” column lists MYPs that address the listed EJ priority Goal/Objective and the long-term goals of the MYP. All MYPs that provides relevant research to the EJ Goal/Objective are included in the matrix, even if that MYP is not formally under that Goal number in the actual Agency Strategic Plan structure. The MYP title and long-term goals are repeated each time the MYP is listed to aid readers who are only interested in a particular area. The volume of relevant research products and results from the MYPs are too extensive to repeat in this plan. A **small number** of the expected outputs from each MYP are included in the matrix for illustrative purposes but are not inclusive of the full breadth of ORD’s work. Please access the identified link for a complete copy of the MYP or for further details regarding the research to be conducted under each MYP.

Goal 1: Clean Air and Global Climate Change

Objective 1: Reduction in number of asthma attacks

Activities (MYP)	Output (one or more examples among many from the MYP)	Outcomes	Point of Contact
<p>Particulate Matter MYP http://www.epa.gov/osp/myp.htm#pm (1) By 2006, develop and transfer new data and tools needed by OAR and the states and tribes to predict, measure, and reduce ambient PM and PM emissions to attain the existing PM NAAQS. (2) By 2009, develop and transfer to ORD and OAR new exposure, epidemiological, toxicological, and clinical data for improved assessments of health risks associated with short term exposure to PM in the general and select susceptible populations. (3) By 2010, integrate and assess new findings in atmospheric, exposure, biological, and environmental sciences and regularly communicate the state of science to OAR to improve environmental decision-making for the PM NAAQS. (4) By 2012, develop and transfer improved data and tools needed by OAR and the states and tribes to attain the PM NAAQS, especially in areas that remain in nonattainment after initial control strategies are implemented, and by ORD and other scientists to refine the environmental factors related to health risks associated with PM exposure. (5) By 2014, develop and transfer to ORD and OAR new exposure, epidemiological, toxicological, and clinical data for improved assessments of health risks associated with short- and long-term exposure to PM, especially in susceptible populations.</p>	<p>Assessment of Regional Deposition Distribution of Inhaled Ultrafine, Fine, and Coarse Particles in Human Lungs http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=72397&ActType=project&keywords=asthma</p> <p><i>Description of Activity (or Product):</i> The hypothesis of this proposed study is that enhanced local dose plays a crucial role on adverse health effects of ambient particulate matter. In the present study we have developed a novel serial bolus delivery method to assess deposition dose in small volumetric compartments of the lung in situ. Using this method, regional deposition values for ten serial lung compartments have been measured in four different subject groups including young normals, old normals (age > 60 years), asthmatics, and patients with COPD. The effects of gender was also investigated in each subject group. The experiments were performed with inert monodisperse aerosols in the size range of 0.04-5 micron in diameter and for a variety of breathing patterns mimicking sleep, resting and light exercise conditions.</p> <p><i>Purpose/Objective:</i> Results from normal young subjects have been published and data analysis is under progress for elderly and COPD subjects. Enhancement of dose at local sites is directly related to lung injuries and may predispose eventual adverse health effects. Local dose enhancement may be a crucial factor for elevated health risk in susceptible population. Specifically, this work will support efforts to (1) Identify factors of susceptibility and describe mechanisms of health effects of acute particulate matter (PM) exposures in susceptible subgroups; (2) Describe respiratory deposition dose of ambient particles in moderate asthmatic and COPD patients; and (3) Describe comprehensive respiratory dose model based on human data for healthy adults and patients with asthma and COPD.</p> <p><i>Point of Contact:</i> janes.deborah@epa.gov; kim.chong@epa.gov, principal investigator</p>	<p>Attain the ambient air quality standards and ensure the air in every American community will be clear, safe, and healthy to breathe for the general population and susceptible subpopulations.</p>	<p>Dan Costa, ORD National Program Director – Air</p>
<p>Air Toxics MYP http://www.epa.gov/osp/myp.htm#airtox (1) By 2008, produce fifteen new or modified tools in the form of methods, models, or assessments that enable national, regional, state, or local officials to identify or implement cost-effective approaches to reduce risks from stationary point, area, mobile, or indoor sources of air toxics. (2) By 2010, provide health hazard and exposure methods, data, and models to enable the Program and Regional Offices to reduce uncertainty in risk</p>	<p>Assessment of Allergic Immune Responses to Indoor Air Fungal Contaminants http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=83649&ActType=project&keywords=asthma</p> <p><i>Description of Activity (or Product):</i> We are using a mouse model to assess immune and inflammatory responses as well as changes in respiratory function and pathology characteristic of allergic asthma to fungal extracts <i>M. anisopliae</i> (MACA), <i>S. chartarum</i> (SCE), and <i>P. chrysogenum</i> (PCE). Of additional importance in understanding allergic responses is the identification and characterization of specific protein allergens. Although no amino acid sequence motifs specific for allergenicity have been identified thus far, in general, protein sensitizers are hydrophilic, heat and digestion stable and may have enzymatic activity.</p> <p><i>Purpose/Objective:</i> The objectives of this research are 1) to evaluate the potential of indoor mold</p>	<p>Reduce emissions and resulting human exposure through implementation of cost-effective control strategies.</p>	<p>Dan Costa, ORD National Program Director – Air</p>

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<p>assessments of acute, chronic, and multi-pathway exposures to air toxics at the national and regional levels, and conduct 3-5 community-level exposure and epidemiology studies to characterize the risk of air toxics at that scale.</p>	<p>contaminants including toxigenic molds to induce allergic and other responses consistent with human allergic asthma in a mouse model, 2) identify IgE inducing proteins from three fungi (Metarhizium anisopliae, Stachybotrys chartarum, and Penicillium chrysogenum), and 3) assess the relative potency and rank mold allergens in comparison to each other and to known respiratory allergens. Results of this research will provide the EPA regional offices and the Office of Indoor Air with scientifically sound answers to some of the mold related inquiries they regularly receive. Additionally, this research will provide insight into the potency rankings of various molds and protein allergens in general.</p> <p>The indoor environment has increased in importance to childrens health with children now spending more than 90% of their time indoors. Molds are an important component of this environment and have been associated with exacerbation of asthma. Their contribution to the induction of allergic asthma is less certain. This model will be useful to assess the potency of mold allergens relative to other indoor allergens as well as to help establish the relative importance of mold in the indoor environment. Ultimately, the identification of specific allergens will provide the tool needed to test humans for allergic antibodies to these microbes. This also falls into GPRA Goal 4 Healthy Communities and Eco Systems</p> <p><i>Point of Contact:</i> janes.deborah@epa.gov; Ward.Marsha@epamail.epa.gov, principal investigator</p>		
<p>Human Health MYP http://www.epa.gov/osp/myp.htm#hh (1) By 2008, provide the scientific understanding and tools to assist the Agency and others in evaluating the effectiveness of public health outcomes resulting from environmental risk management options. (2) By 2008, provide regulatory decision makers with data-based models, risk assessment approaches, and guidance that will be used for conducting assessments for aggregate exposure and risks to pollutants that pose the greatest health risks to the American public. (3) By 2012, develop a commonly accepted approach for estimating the risk to human health posed by exposure to toxic chemicals in the environment that incorporates information on biological modes or mechanisms governing their toxicity. (4) By 2012, provide regulatory decision makers with data-based models, risk assessment approaches, and guidance that will be used for conducting assessments for cumulative exposure and risks to pollutants that pose the greatest health risks to the American public. (5) By 2014, demonstrate why some groups of people, defined by life stage, genetic factors, and health status, are more vulnerable than others to adverse effects from exposure to environmental agents.</p>	<p>Asthma Health Outcomes Project http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=139251&ActType=project&keywords=asthma</p> <p><i>Description of Activity (or Product):</i> With EPA support, the University of Michigan School of Public Health has conducted an extensive assessment of more than 350 asthma interventions, including many community based initiatives. This landmark national scale study determined the program attributes and characteristics, including the nature of environmental risk reduction approaches, which contribute to improved asthma health outcomes.</p> <p><i>Purpose/Objective:</i> Our intention is that these study findings will be used to guide the EPA Asthma Initiative as well as other federal, state and local programs to bring effective interventions to the national public health effort to reduce the burden of asthma. This study was designed to determine the structure, content, and environmental risk reduction approaches of asthma interventions, drawing from the published literature as well as the many community-based initiatives throughout the country. The investigators designed a unique evaluation protocol and have determined the programmatic features associated with positive health outcomes.</p> <p><i>Point of Contact:</i> smith.alisa@epa.gov, project officer</p> <p>Detroit Children's Health Study http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=138850&ActType=project&keywords=asthma</p> <p><i>Description of Activity (or Product):</i> The Detroit Children's Health Study will consist of health questionnaires for 15,000 children enrolled in the fourth- and fifth-grades of selected elementary schools, and measurements of lung function and exhaled breath in a subset of 3,500 of these children. Participation in both components will be entirely voluntary with full protections for study</p>	<p>Harmonized cancer and non-cancer risk assessments; improved hazard ID for universe of chemicals; reduced uncertainties in risk assessment; increased use of biomarkers in risk assessments; improved human health from more scientifically defensible hazard ID, risk assessment and risk management practices; better management of resources to protect the environment.</p>	<p>Hugh Tilson, ORD National Program Director (Acting) – Human Health</p>

Activities (MYP)	Output (one or more examples among many from the MYP)	Outcomes	Point of Contact
	<p>participants. The 20-page health questionnaire, to be completed by the child's parent or guardian, will cover respiratory outcomes, such as asthma and wheeze symptoms, and known risk factors such as environmental tobacco smoke, parental health conditions, and housing characteristics. In a parallel study, EPA/NERL scientists will assess neighborhood differences in air pollutant concentrations.</p> <p><i>Purpose/Objective:</i> This study is part of EPA's ongoing research on the adverse health effects of long-term air pollutant exposures in susceptible populations. The Detroit Children's Health Study builds on previous studies in southern California, Germany, and the Netherlands. From 1999 through 2003, EPA's National Health and Environmental Effects Research Laboratory (EPA/NHEERL) conducted a similar research project, the El Paso Children's Health Study, in collaboration with scientists from EPA's National Exposure Research Laboratory (EPA/NERL). The border cities of Detroit and El Paso share common characteristics such as major diesel truck routes and vehicle idling at international borders, but the two cities have great climatic differences. The Detroit Children's Health Study also will add direct immunologic measures to assess allergy and asthma in these schoolchildren.</p> <p><i>Point of Contact:</i> janes.deborah@epa.gov</p>		
<p>Ozone MYP – under development http://www.epa.gov/osp/myp.htm#ozone By 2010, provide Air Quality Criteria Documents, research needs documents, and consultation to the Program Office on the proposal and promulgation of the periodic review of the National Ambient Air Quality Standards for ozone, nitrogen oxides, and carbon monoxide. By 2013, provide regionally evaluated models and methods to attain 8-hr Ozone NAAQS focusing on remaining non-attainment areas and maintenance plans.</p>	<p>A Pilot Study of Potential Biomarkers of Ozone Exposure http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=54441&ActType=project&keywords=ozone</p> <p><i>Description of Activity (or Product):</i> The investigators reported that nonanal levels were significantly higher in lung fluid samples obtained immediately after ozone exposure ceased and returned to control levels (established from exposures to filtered air) 18 hours after exposure ceased. (Changes in hexanal were not statistically significant at either time point.) Smokers and nonsmokers showed similar increases. The increased level of nonanal suggests that aldehydes may be useful markers of ozone exposure. (Nonanal is also a toxic compound that may play a role in the adverse effects caused by ozone exposure.) However, aldehyde identification was not rigorously quantified in this study; therefore, the results must be considered as qualitative rather than quantitative. In addition, because the subjects in this study were exposed to only one concentration of ozone, studies using a range of ozone levels are required to confirm this preliminary observation and substantiate the relation between nonanal formation and ozone exposure level.</p> <p><i>Purpose/Objective:</i> Ozone, a major constituent of smog and a lung airway irritant, induces transient declines in lung function and respiratory tract inflammation in some people. Studies with laboratory animals have demonstrated that pathologic and physiologic effects of ozone on the respiratory system depend on the dose and duration of exposure. Although sensitive and accurate methods are available to measure the levels of ozone in ambient air, no methods have been developed to determine the dose of ozone that reaches tissues in the respiratory tract. Such methods would aid researchers conducting clinical studies and those seeking to extrapolate the results of animal studies to humans.</p> <p><i>Point of Contact:</i> katz.stacey@epa.gov, project officer</p>	<p>Reduce the human health and eco effects of ozone exposure by providing research and tools that will help States reduce their ozone emission precursors and meet the ozone NAAQS; and determine the appropriate ozone NAAQS to protect human and ecosystem health. Support implementation and attainment of ozone NAAQS by EPA, States, and Tribes, by providing evaluated state-of-science modeling, monitoring, and other tools; and</p>	<p>Dan Costa, ORD National Program Director – Air</p>

Activities (MYP)	Output (one or more examples among many from the MYP)	Outcomes	Point of Contact
		training in their use, in order to increase the number of areas in attainment.	

Objective 2: Reduce exposure to air toxics

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p><u>Particulate Matter MYP</u> http://www.epa.gov/osp/myp.htm#pm By 2006, develop and transfer new data and tools needed by OAR and the states and tribes to predict, measure, and reduce ambient PM and PM emissions to attain the existing PM NAAQS. (2) By 2009, develop and transfer to ORD and OAR new exposure, epidemiological, toxicological, and clinical data for improved assessments of health risks associated with short term exposure to PM in the general and select susceptible populations. (3) By 2010, integrate and assess new findings in atmospheric, exposure, biological, and environmental sciences and regularly communicate the state of science to OAR to improve environmental decision-making for the PM NAAQS. (4) By 2012, develop and transfer improved data and tools needed by OAR and the states and tribes to attain the PM NAAQS, especially in areas that remain in nonattainment after initial control strategies are implemented, and by ORD and other scientists to refine the environmental factors related to health risks associated with PM exposure. (5) By 2014, develop and transfer to ORD and OAR new exposure, epidemiological, toxicological, and clinical data for improved assessments of health risks associated with short- and long-term exposure to PM, especially in susceptible populations.</p>	<p><u>Air Toxics Emissions Characterization, Controls & Prevention</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=73330&ActType=project&keywords=air%20toxics</p> <p><i>Description of Activity (or Product):</i> Studies will be conducted to achieve the following: (1) refine estimates of toxic emissions from all classes of highway vehicles including how these emissions change under various vehicle operation modes (modal-based emissions models); (2) improve emission factors and the temporal and spatial resolution of HAPs from small dispersed area sources; (3) develop new and improved methods and models to determine emissions of indoor HAPs; (4) understand chemical reactions between pollutants in the indoor environment; (5) develop a fundamental understanding of how air toxic pollutants are formed and prevented in industrial and combustion processes; (6) identify and develop emissions control and Pollution Prevention (P2) alternatives for ambient area source categories; and (7) determine the risk reduction potential of P2 alternatives and control technologies appropriate for indoor sources.</p> <p><i>Purpose/Objective:</i> The goals of this research are to develop improved techniques to characterize hazardous air pollutant emissions from outdoor and indoor sources; use these techniques to better understand the relative contribution of specific sources to actual human exposure, and identify innovative low-cost approaches to control or prevent HAP emissions.</p> <p>All of the information generated through this research area will support either improved characterization of risks posed by HAPs or development of future risk management strategies to reduce exposure. Specifically the research will support implementation of out-year MACT standards, development and implementation of future urban toxic regulations, and determination of residual risks.</p> <p><i>Point of Contact:</i> hoskins.anna@epa.gov</p>	<p>Attain the ambient air quality standards and ensure the air in every American community will be clear, safe, and healthy to breathe for the general population and susceptible subpopulations.</p>	<p>Dan Costa, ORD National Program Director – Air</p>
<p><u>Air Toxics MYP</u> http://www.epa.gov/osp/myp.htm#airtox</p>	<p><u>Community Scale Air Toxics Modeling with CMAQ</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=66599&ActType=project&keywords=ur</p>	<p>Reduce emissions and resulting</p>	<p>Dan Costa, ORD National Program</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>(1) By 2008, produce fifteen new or modified tools in the form of methods, models, or assessments that enable national, regional, state, or local officials to identify or implement cost-effective approaches to reduce risks from stationary point, area, mobile, or indoor sources of air toxics. (2) By 2010, provide health hazard and exposure methods, data, and models to enable the Program and Regional Offices to reduce uncertainty in risk assessments of acute, chronic, and multi-pathway exposures to air toxics at the national and regional levels, and conduct 3-5 community-level exposure and epidemiology studies to characterize the risk of air toxics at that scale.</p>	<p>ban%20air%20toxics</p> <p><i>Description of Activity (or Product):</i> Consideration and movement for an urban air toxics control strategy is toward a community, exposure and risk-based modeling approach, with emphasis on assessments of areas that experience high air toxic concentration levels, the so-called "hot spots". This strategy will require information that accurately maps and characterizes the spatial and temporal variability of such pollutants. Many air toxic pollutants are active in photochemistry and ambient concentration levels will, therefore, depend on both the magnitude of the secondary products from the inflow regional background as well as from fresh emissions. This paper has been reviewed in accordance with United States Environmental Protection Agency's peer and administrative review policies and approved for presentation and publication.</p> <p><i>Purpose/Objective:</i> In principle, the Community Multi-scale Air Quality (CMAQ) modeling system, using multi-scale modeling attributes can provide the ambient concentrations of air toxics from both regional and local sources and through advanced treatment of chemical, transport and deposition pathways. This paper explores the CMAQ capability to model air toxics at fine scale to meet the desired air toxics assessments objectives. The objective of this task is to develop and evaluate numerical and physical modeling tools for simulating ground-level concentrations of airborne substances in urban settings at spatial scales ranging from ~1-10 km. These tools will support client needs in the areas of air toxics and homeland security. The air toxics tools will benefit the National Air Toxics Assessment (NATA) program and human exposure modeling needs within EPA. The homeland security-related portion of this task will help in developing tools to assess the threat posed by the release of airborne agents. Both sets of tools will consider the effects induced by urban morphology on fine-scale concentration distributions.</p> <p><i>Point of Contact:</i> petterson.lynne@epa.gov; ching.jason@epa.gov, project officer</p>	<p>human exposure through implementation of cost-effective control strategies.</p>	<p>Director – Air</p>
<p>Ozone MYP – under development http://www.epa.gov/osp/myr.htm#ozone By 2010, provide Air Quality Criteria Documents, research needs documents, and consultation to the Program Office on the proposal and promulgation of the periodic review of the National Ambient Air Quality Standards for ozone, nitrogen oxides, and carbon monoxide. By 2013, provide regionally evaluated models and methods to attain 8-hr Ozone NAAQS focusing on remaining non-attainment areas and maintenance plans.</p>	<p><u>Air Quality and Global Climate Change</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=56093&ActType=project&keywords=ozone</p> <p><i>Description of Activity (or Product):</i> Predicted changes in the global climate over the next hundred years and beyond could alter weather patterns impacting land use, source emissions, and tropospheric air quality. The United States has a series of standards for criteria and other air pollutants in place to safeguard air quality for protection of human and ecosystem health. This project, titled Climate Impact on Regional Air Quality (CIRAQ), examines global climate change scenarios as they might affect regional and urban tropospheric air quality in North America for ozone and fine particles. Scenarios are examined by developing meteorological, emissions, and air quality modeling simulations on gridded domains covering the U.S. and southern Canada. Multi-year length simulations are generated for present and future (2050) conditions. This Task evaluates the sensitivity of air quality and meteorologically-dependent emission factors to potential climate change scenarios while holding all other emissions, landuse and vegetation cover constant at present levels. The purpose of this approach is to isolate modeled sensitivities of air quality to potential climate change scenarios without the added effects from future emission growth or changes. A later Task (Task 20478) develops a series of model tests including future emission scenarios. The CIRAQ Project supports the USEPA Global Change Research Program (GCRP) as described in the ORD Global Change Multi-year plan. Results will contribute to U.S. Climate Change Research Program (CCSP) synthesis reports dealing with air quality scenarios and the socioeconomic impacts of climate variability.</p>	<p>Reduce the human health and eco effects of ozone exposure by providing research and tools that will help States reduce their ozone emission precursors and meet the ozone NAAQS; and determine the appropriate ozone NAAQS to protect human and ecosystem health. Support implementation and attainment of ozone NAAQS by EPA, States, and</p>	<p>Dan Costa, ORD National Program Director – Air</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
	<p><i>Purpose/Objective:</i> The objective of this work is to investigate the impact of global climate change on the urban and regional air quality of the United States. Impacts of climate change on meteorological patterns and primary source emissions are investigated as primary elements influencing future air quality.</p> <p><i>Point of Contact:</i> petterson.lynne@epa.gov</p>	Tribes, by providing evaluated state-of-science modeling, monitoring, and other tools; and training in their use, in order to increase the number of areas in attainment.	

Goal 2: Clean and Safe Water

Objective 1: Safe fish/shellfish

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Water Quality MYP http://www.epa.gov/osp/myq.htm#wq</p> <p>LTG 1: Provide the approaches and methods to develop and apply criteria for habitat alteration, nutrients, suspended and bedded sediments, pathogens and toxic chemicals that will support designated uses for aquatic systems. LTG 2: Provide the tools to assess and diagnose the causes and pollutant sources of impairment in aquatic systems. LTG 3: Provide the tools to restore and protect impaired aquatic systems and to forecast the ecological, economic, and human health benefits of alternative approaches to attain water quality standards. LTG 4: Provide the approaches, methods and tools to assess the exposures and reduce the human health risks from biosolids contaminants for use by OW, States and others in updating biosolids guidance and regulations.</p>	<p><u>Adaptive Management for Improved Water Quality in Multi-Use Watersheds</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=57810&ActType=project&keywords=Water%20Quality</p> <p><i>Description of Activity (or Product):</i> This project will develop a management plan for eliminating nuisance algal blooms in a chain of reservoirs along the Huron River in southeastern Michigan. The river-reservoir system is used for municipal drinking water, wastewater disposal, irrigation, industrial processes, hydroelectric generation, sport fishing, and recreation. The impoundments episodically develop surface scums of bluegreen algae, and emit foul odors including hydrogen sulfide. The project is highly relevant to local, regional, and State efforts that have been trying for years to improve water quality in this watershed. Partnerships have been formed to ensure that the scientific information gained through this project become translated into education, outreach, policy, and decision-making. Past management strategy has focused on phosphorus loading alone, but it has failed to prevent massive nuisance conditions as recently as summer 2001. Efforts based on new thinking successfully predicted the 2001 blooms; now this study will sharpen the predictions and develop management approaches to eliminate nuisance conditions in the future.</p> <p><i>Purpose/Objective:</i> Project objectives include compartmentalizing the river system to pinpoint watershed segments responsible for inputs and internal processes that reduce stoichiometric ratios of nitrogen to phosphorus. Evaluating the role of redox transformations and assessing magnitudes of anaerobic nitrate respiration are key elements of the research plan. The project will evaluate interactions of river discharge volumes, internal transformations, and weather events as components of adaptive management theory. It will identify the places and conditions that account for significant amounts of denitrification, as well as reservoir management responses that can counteract the conditions that promote nuisance blooms.</p> <p><i>Point of Contact:</i> perovich.gina@epa.gov, project officer</p>	Support attainment of clean and safe water.	Chuck Noss, ORD National Program Director – Water Quality

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Endocrine Disruptors MYP http://www.epa.gov/osp/myp.htm#edc LTG 1: Provide a better understanding of the science underlying the effects, exposure, assessment, and management of endocrine disruptors. LTG 2: Determine the extent of the impact of endocrine disruptors on humans, wildlife, and the environment. LTG 3: Support EPA's screening and testing program.</p>	<p>Cellular and Molecular Mechanisms of Abnormal Reproductive Development http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=72351&ActType=project&keywords=EDC</p> <p><i>Description of Activity (or Product):</i> These studies will 1) provide hazard identification and dose response (to identify NOAELS and LOAELS) on critical EDCs, 2) identify data gaps in current test protocols, 3) identify useful endpoints for EDSTAC Tier 2 Testing protocols using enhanced multigenerational studies and 4) hopefully, identify the concentrations of the active toxicants in the fetal and maternal tissues during sexual differentiation for comparison to human exposures.</p> <p><i>Purpose/Objective:</i> A critical risk assessment issue is the impact of developmental exposures on function later in life. Development is a period when hormone-mediated organizational changes in gene expression can have permanent consequences rather than simply mediating transient alterations. These organizational changes may not be apparent until later in life because functional changes do not occur until puberty or adulthood. Finally, it has been suggested that there are processes for which there may be no apparent threshold due to limitations in the kinds of regulatory, surveillance, and repair processes that create biological thresholds in adults. Studies with exposure doses spanning several orders of magnitude will need to be undertaken to address questions about developmental versus adult sensitivity and their dose-response relationships.</p> <p><i>Point of Contact:</i> janes.deborah@epa.gov; Gray.Earl@epa.gov, principal investigator</p>	<p>To support its regulatory mandates, EPA's research focuses on improving our scientific understanding of the exposures, effects, and management of endocrine disruptor chemicals and determining the extent of the impact they may have on humans, wildlife, and the environment. EPA will evaluate current and develop new standardized protocols to screen chemicals for their potential endocrine effects.</p>	<p>Elaine Francis, ORD National Program Director – Safe Pesticides/Safe Products, Endocrine Disrupting Chemicals</p>
<p>Ecological Research MYP http://www.epa.gov/osp/myp.htm#eco LTG 1: The states and tribes use a common monitoring design and appropriate ecological indicators: to determine the status and trends of ecological resources. LTG 2: Managers and researchers understand links between human activities, natural dynamics, ecological stressors and ecosystem condition. LTG 3: Environmental managers have the tools to predict multi-stressor effects on ecological resources to assess vulnerability and manage for sustainability. LTG 3: Managers have scientifically defensible methods to protect and restore ecosystem condition.</p>	<p>Bioaccumulative Toxics in Native American Shellfish http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=54410&ActType=project&keywords=shellfish</p> <p><i>Description of Activity (or Product):</i> The two-part central hypothesis states that Swinomish people are exposed to low level, chronic bioaccumulative toxics when participating in subsistence consumption of shellfish in traditional harvesting areas, and this exposure contributes to the high incidences of health related problems on the Reservation.</p> <p><i>Purpose/Objective:</i> This project will complement other ongoing funded projects including the paralytic shellfish poison monitoring program, fresh and marine water quality monitoring programs, ambient air quality program, EPA non-point source pollution 319 program, and the Swinomish indoor air quality/medical clinic health monitoring program. The two primary objectives of the project are 1- To determine the type and concentrations of bioaccumulative toxics present in shellfish, and 2- to determine what if any connections exist between shellfish toxics and the health of the Swinomish people. Secondary objectives include effective and culturally appropriate communication of identified health risks to the Swinomish community and nearby tribes who also participate in subsistence shellfish harvesting in order to develop and implement a mitigation measures to reduce health risks from shellfish consumption.</p> <p><i>Point of Contact:</i> pongsiri.montira@epa.gov, project officer</p>	<p>EPA is focusing on strengthening our scientific basis to adequately assess and compare risks to ecosystems, to protect and restore them, and to track progress in terms of ecological outcomes. Global climate change, loss and destruction of habitat due to sprawl and exploitation of natural resources, invasive species, non-point source pollution, and the accumulation and interaction of these effects present emerging ecological problems.</p>	<p>Kevin Summers, ORD National Program Director – Ecosystem Protection</p>
<p>Mercury MYP http://www.epa.gov/osp/myp.htm#merc</p>	<p>Fish Consumption Patterns and Mercury Concentrations http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=56070&ActType=project&keywords=fish</p>	<p>1) Reduce and prevent release of</p>	<p>Joel Scheraga, ORD National</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Develop risk management research for managing emissions from coal-fired utilities (critical information for rule-making) and non-combustion sources of mercury; risk management research for fate and transport of mercury to fish; regionally-based ecological assessments of the effects of methyl mercury on birds; assessment of methyl mercury in human populations; and risk communication methods and tools.</p>	<p>h%20consumption</p> <p><i>Description of Activity (or Product):</i> Mercury contamination in fish poses potentially significant human health and ecological problems. This project combines information on fish consumption patterns and data on the amount of mercury in fish for use as a direct indicator of levels of human exposure. These data will be spatially analyzed with Geographic Information System (GIS) techniques. These data will be further analyzed statistically to better understand not only regional and local exposure levels, but to also understand the potential sources of these exposures. The products from this project include a database of consolidated information on fish consumption from multiple state survey reports and a preliminary analysis on a set of survey data collected by several states. The Fish Survey database is an invaluable tool for both the ecological and human health risk assessors. The analysis on population specific fish consumption distributions will be used to update the Exposure Factors Handbook. The analysis will be useful for risk assessment scientists seeking to use fish consumption data. The information can also be added to the next update of EPA's Exposure Factors Handbook</p> <p><i>Purpose/Objective:</i> Provide information to risk assessors on fish consumption patterns and mercury levels in fish to help make sound science-based decisions to better protect human health. These data will be used as an estimator for human fish consumption and exposure to mercury.</p> <p><i>Project Status:</i> The database of consolidated fish consumption reports was completed and delivered to the EPA on September 30, 2003, and is undergoing a technical database review with plans to release the database internally to EPA in 2004. In 2004-2005, a distribution analysis will be conducted on several studies.</p> <p><i>Point of Contact:</i> itkin.cheryl@epa.gov</p>	<p>mercury into the environment, and 2) Understand the transport and fate of mercury from release to the receptor and its effects on the receptor.</p>	<p>Program Director – Mercury</p>

Objective 2: Clean and safe drinking water

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Drinking Water MYP http://www.epa.gov/osp/myr.htm#dw</p> <p>(1) By 2009, provide data, tools and technologies to support management decisions by the Office of Water, state, local authorities and utilities to protect source water and the quality of water in the distribution system. (2) By 2010, develop new data, innovative tools and improved technologies to support decision making by the Office of Water on the Contaminant Candidate List and other regulatory issues, and implementation of rules by States, local authorities and water utilities.</p>	<p><u>A Prospective Epidemiological Study of Gastrointestinal Health Effects Associated With Adult and Developmental Neurotoxicity and Immunotoxicity of Organotin Pvc Leachates</u> <u>http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=72435&ActType=project&keywords=CC</u></p> <p><i>Description of Activity (or Product):</i> The primary source of organotins in drinking water is believed to be PVC leachates. Limited occurrence data from residential surveys indicate as much as 300 ng/l of monomethyltin can be detected. Noland et al., (1982) reported that exposure of rats to monomethyltin (12, 40, 120 mg/L) or trimethyltin (0.15, 0.5, 1.0 mg/L) in drinking water during pregnancy and postnatal development results in a learning impairment in the offspring consistent with altered development of the limbic system. The current research will: 1) characterize the dose-dependence of the learning impairment and identify structural and developmental correlates, and 2) assess the relative potency of various organotin species and their mixtures to disrupt developmental events.</p>	<p>Safe Drinking Water Act Amendments of 1996 direct EPA to conduct research to strengthen the scientific foundation for standards that limit public exposure to drinking water contaminants. The Amendments contain specific</p>	<p>Greg Sayles, ORD National Program Director – Drinking Water</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>(3) By 2010, develop scientifically sound data and approaches to assess and manage risks to human health posed by exposure to regulated waterborne pathogens and chemicals, including those addressed by the Arsenic, M/DBP, and Six-Year Review Rules.</p>	<p><i>Purpose/ Objective:</i> The objective of this research is to identify and characterize potential developmental neurotoxic effects associated with exposure to organotins that may leach from PVC pipe used in residences and distribution systems. Results of this research will aid the Office of Water in its regulatory determination process for these Candidate Contaminant List (CCL) chemicals.</p> <p><i>Point of Contact:</i> janes.deborah@epa.gov</p> <p><u>Arsenic Exposure Study, Washington State</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=59161&ActType=project&keywords=shellfish</p> <p><i>Description of Activity (or Product):</i> The study will collect information that will analyze environmental pathways of exposure through the collection of food and drinking water samples. Identified families will be asked to provide urine, blood and food samples as well as dietary histories for the last week and an additional 24 hour recall dietary history. Twenty-five families of the SKlallam tribe that have been resident in the area over the last 12 months will be asked to participate in the study. They will be asked to provide information about their health and their water consumption habits. An adult member of each household will be asked to set aside a duplicate portion of every food and drink item they eat for a 24 hour period. All members of the household will be asked to collect two first morning urine samples and record everything they eat for the 24 hours between urine collections. At the time of enrollment participants will have their height and weight measured and a sample of blood drawn. A Committee for the Protection of Human Subjects has reviewed this study and all information collected will be kept confidential.</p> <p><i>Purpose/ Objective:</i> The Port Gamble SKlallam tribe has requested that the US Environmental Protection Agency assist them in understanding their exposures to arsenic from both food and water. A previous study has suggested that locally harvested shellfish which are a component of their diet contain large amounts of arsenic. The local drinking water may also contribute to arsenic exposures. Both food and water can be sources of exposure to arsenic. The keys to evaluating the potential effects of long term exposure to low levels of arsenic are to identify sources of exposure and to determine how much arsenic is obtained from all sources. Recent studies have shown that urinary concentrations of inorganic arsenic and its metabolism to organic arsenic are excellent markers of exposure in individuals chronically exposed to arsenic in their drinking water. In all of the epidemiologic and exposure studies done to date, the role of high arsenic foods in individuals chronically exposed has not been evaluated because of the lack of adequate methods to analyze the levels of arsenic in food. Recently at EPA, the ability to analyze food for arsenic and its species have been developed and the role of food in arsenic exposure can be examined.</p> <p><i>Point of Contact:</i> janes.deborah@epa.gov; thomas.david@epa.gov, principal investigator</p>	<p>requirements for research on waterborne pathogens, such as Cryptosporidium and Norwalk virus; disinfection byproducts; arsenic; and other harmful substances in drinking water. EPA is also directed to conduct studies to identify and characterize population groups, such as children, that may be at greater risk from exposure to contaminants in drinking water than is the general population.</p>	
<p><u>Drinking Water – Homeland Security</u> http://www.epa.gov/nhsrc/wip.htm Examples: Reports describing the most likely physical, electronic or cyber, and contamination threats to the nation’s drinking water and wastewater systems. Updates of</p>	<p><u>Multiplexed Chemical Sensor for Water Security:</u> http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/7487/report/0</p> <p><i>Description of Activity (or Product):</i> In Phase I, Real-Time Analyzers, Inc., will develop the sensors to selectively detect several chemical agent hydrolysis products, toxic industrial chemicals, and pesticides at concentrations below 1 mg/L in flowing streams in 10 minutes. In Phase II, Real-Time Analyzers will interface the SER sensors into optical probes that tie into selected water distribution points, improve sensitivity to 10 µg/L in 10 minutes for 30 analytes, and develop</p>	<p>Water infrastructure protection research focuses on the safety of the nation’s water supply, treatment, and distribution</p>	<p>Kim Fox, ORD Homeland Security Division Director – Water</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>software tools and training to help water facilities conduct vulnerability assessments of their systems. Guidance, decision trees, protocols, and methodical approaches for responding to contamination threats and incidents.</p>	<p>multiplexing software compatible with supervisory control and data acquisition systems. Sensitivity, selectivity, and process capabilities will be evaluated using actual chemical warfare agents at Aberdeen Proving Ground under a subcontract.</p> <p><i>Purpose/ Objective:</i> The goal of this research project (through Phase III) is to develop a chemical sensor that can be multiplexed into water distribution systems to provide early warning of poisoned water supplies. This will be accomplished by developing surface-enhanced Raman (SER) sensors that can be integrated into water supply systems and coupled to a central Raman analyzer via fiber optics.</p> <p><i>Point of Contact:</i> gallup.james@epa.gov</p>	<p>systems. Researchers investigate ways to identify vulnerabilities, detect contamination, warn the public, and respond effectively in the event of a biological or chemical attack on any of these systems.</p>	<p>Infrastructure. Protection</p>

Goal 4: Healthy Communities and Ecosystems

Objective 1: Reducing elevated blood lead levels

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Drinking Water MYP http://www.epa.gov/osp/myp.htm#dw</p> <p>By 2009, provide data, tools and technologies to support management decisions by the Office of Water, state, local authorities and utilities to protect source water and the quality of water in the distribution system. (2) By 2010, develop new data, innovative tools and improved technologies to support decision making by the Office of Water on the Contaminant Candidate List and other regulatory issues, and implementation of rules by States, local authorities and water utilities. (3) By 2010, develop scientifically sound data and approaches to assess and manage risks to human health posed by exposure to regulated waterborne pathogens and chemicals, including those addressed by the Arsenic, M/DBP, and Six-Year Review Rules.</p>	<p>The Effect of Oxidant in Metal Corrosion in Drinking Water http://oaspub.epa.gov/eims/eimsapi.dispdetail?deid=29099</p> <p><i>Description of Activity:</i> The effect of oxidizing conditions on metal release, corrosion rate and corrosion scale properties of distribution system pipe material (lead, copper and iron) is poorly understood. New research on this topic will be valuable in reducing distribution system corrosion problems.</p> <p>Status – ongoing. Study findings to date have shown that lead corrosion deposits formed on lead coupons in water having a high redox potential (well chlorinated water, pH=7) do contain Pb4+ solids including PbO2. In contrast, water that has a relatively low redox potential (no chlorine) do not produce Pb(IV) solids. Also, the rate of metal release from the metals coupons, particularly copper, was affected by redox conditions. Faster copper release rates were observed in water having the higher redox potential. Soluble copper and lead concentrations were not obviously affected by the redox potential of the water.</p> <p><i>Purpose/Objective:</i> The link between Oxidation Reduction Potential (ORP) and oxidant composition, and corrosion has not been examined. For ORP to be a useful predictive corrosion evaluation tool, it is important to know whether the effect of ORP on corrosion is independent of oxidant type and concentration in water. If so, ORP can be a potentially useful measurement in optimizing corrosion control. The objective of this research project is to study the effect of oxidant type and concentration, and ORP on the release of metal from metal coupons and the properties of corrosion by-product scale.</p> <p><i>Point of Contact:</i> Lytle.Darren@epa.gov (NRMRL)</p>	<p>Safe Drinking Water Act Amendments of 1996 direct EPA to conduct research to strengthen the scientific foundation for standards that limit public exposure to drinking water contaminants.</p>	<p>Greg Sayles, ORD National Program Director – Drinking Water</p>
<p>Human Health MYP http://www.epa.gov/osp/myp.htm#hh</p> <p>(1) By 2008, provide the scientific understanding and tools to assist the Agency and others in evaluating the effectiveness of public health outcomes resulting from environmental risk management options. (2) By 2008, provide regulatory decision makers with data-based models, risk assessment approaches, and guidance that will be used for conducting assessments for aggregate exposure and risks to pollutants that pose the greatest health risks to the American public. (3) By 2012, develop a commonly accepted approach for estimating the risk to human health posed by exposure to toxic chemicals in</p>	<p>All-Ages Lead Model http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=22517&ActType=project&keywords=Lead</p> <p><i>Description of Activity (or Product):</i> The precursor to the All Ages Lead Model (AALM) was the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children. Version 0.99d of the IEUBK was released in March 1994, and has been widely accepted in the risk assessment community as a tool for implementing the site specific risk assessment process when the issue is childhood lead exposure. Recognizing the need to expand the model to include older childhood and adult lead exposure and to add several features not currently available with the IEUBK model, the AALM was initiated in FY98, when the exposure module was expanded to a full age range (0-90 years) and revised to incorporate several new model features and user options. In FY99, additional AALM development was accomplished with the expansion of the uptake and biokinetic modules. Each of the three modules were circulated for limited internal (within EPA) review and comment during FY00. The all-ages lead model has been further developed in response to expert recommendations in FY01-04 and proposed for SAB review in FY05.</p> <p><i>Purpose/ Objective:</i> The All Ages Lead Model will predict lead concentration in body tissues and</p>	<p>Harmonized cancer and non-cancer risk assessments; improved hazard identification for universe of chemicals; reduced uncertainties in risk assessment; increased use of biomarkers in risk assessments; improved human health from more scientifically defensible hazard ID, risk assessment</p>	<p>Hugh Tilson, ORD National Program Director (Acting) – Human Health</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>the environment that incorporates information on biological modes or mechanisms governing their toxicity. (4) By 2012, provide regulatory decision makers with data-based models, risk assessment approaches, and guidance that will be used for conducting assessments for cumulative exposure and risks to pollutants that pose the greatest health risks to the American public. (5) By 2014, demonstrate why some groups of people, defined by life stage, genetic factors, and health status, are more vulnerable than others to adverse effects from exposure to environmental agents.</p>	<p>organs for a hypothetical individual, based on a simulated lifetime of lead exposure. Statistical methods will be used to extrapolate to a population of similarly exposed individuals. The outcome will be reduced uncertainty in lead exposure assessments for adults and children. Exposure assessment is an integral part of risk assessment in which NCEA, according to its mission, serves as the national resource center.</p> <p>This project is on-going. It will undergo an additional round of internal review to incorporate newly published information. SAB review will be requested for FY05.</p> <p><i>Point of Contact:</i> elias.robert@epa.gov, principal investigator</p> <p><u>Center for the Study of Prevalent Neurotoxicants in Children:</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=53825&ActType=project&keywords=Blood%20Lead</p> <p><i>Description of Activity (or Product):</i> We will also conduct a nested, randomized controlled trial to test the efficacy of lead hazard controls on the development of adverse neurobehavioral effects. We will test the following hypotheses: (1) Children in the Lead Reduction Group will have blood lead levels that lower, significantly higher cognitive scores, less hearing loss, and fewer behavioral problems than the Control Group at 36 months of age; (2) Fetal and postnatal exposures to pesticides, ETS and lead are associated with adverse neurobehavioral effects, growth delay and hearing loss in early childhood; (3) Fetal exposures are less predictive of the adverse effects of toxicants on cognition, behavioral problems and hearing, compared with the same toxicants in meconium.</p> <p><i>Purpose/ Objective:</i> Exposure to numerous environmental agents, including lead, mercury, PCB's, and environmental tobacco smoke, has been linked with adverse neurobehavioral effects. This project, in combination with the research, will test the efficacy of an intervention for the primary prevention of lead toxicity, as measured by lead concentration and neurobehavioral functioning at 36 months of age, serve as a model to evaluate the adverse effects of exposures to multiple prevalent toxicants among fetuses and children, test meconium levels as a biomarker of fetal exposure to numerous toxicants, and provide exposure and risk assessment data for residential pesticides.</p> <p><i>Point of Contact:</i> saint.chris@epa.gov, project officer</p>	<p>and risk management practices; better management of resources to protect the environment.</p>	

Objective 2: Collaborative problem-solving to address EJ issues

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Science and Tech. for Sustainability http://www.epa.gov/osp/mypp2 Currently Under Development</p>	<p><u>Bringing Global Thinking to Local Sustainability Efforts: A Collaborative Project for the Boston Metropolitan Region</u> http://cfpub.epa.gov/ncer/abstracts/index.cfm/fuseaction/display_abstractDetail/abstract/7575/report/0</p> <p><i>Description of Activity (or Product):</i> Building on the rich data already developed by our partners, and with inputs from the MetroFuture visioning process, we will develop a range of scenarios for stakeholder groups to explore the sustainability of alternative futures and also test some principles of social learning theory. The results will directly impact MetroFuture, the long-term regional plan being developed by MAPC and will be linked to other policymaking processes in the region such as the MA State Sustainability Program, the Boston Indicators Project, and the Massachusetts Climate Protection Plan.</p> <p><i>Purpose/ Objective:</i> Long-range planning for sustainability poses the challenge of indeterminacy - ignorance, surprise, and human volition (Raskin et al., 1998). A scenario approach offers a powerful way to examine the forces shaping our world, the uncertainties that lie ahead, and the implications for tomorrow of trends and actions today. Using participatory visioning with a decision-support system, PoleStar, that incorporates the latest science on the complex linkages between social, economic and environmental elements in a long-term perspective, this project will promote more preventative planning, as well as a global sensibility concerning sustainability in planning and policy dialogues.</p> <p><i>Point of Contact:</i> Bauer.Diana@epa.gov</p>	<p>Currently Under Development</p>	<p>Randy Wentsel, ORD National Program Director – Contaminated Sites/RCRA and Sustainability</p>
<p>Economics and Decision Sciences MYP http://www.epa.gov/osp/mypp2 Currently Under Development</p>	<p><u>American Healthy Homes Study</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=114557&ActType=project&keywords=American%20Healthy%20Homes%20Study%20</p> <p><i>Description of Activity (or Product):</i> The U.S. Environmental Protection Agency's (EPA) National Exposure Research Laboratory (NERL) and the Office of Pollution Prevention and Toxics (OPPT) are collaborating with the U.S. Department of Housing and Urban Development's (HUD) Office of Healthy Homes and Lead Hazard Control (OHHLHC) to perform a national survey of housing related hazards. The collaboration between EPA and HUD will produce a national database that will provide estimates for levels of residential exposures besides lead and allergens. The project, the American Healthy Homes Survey (AHHS), will provide the first ever national estimates of the levels of additional housing-related potential health hazards such as pesticides, perfluorooctanoic acid (PFOA), and arsenic (As) concentrations found near chromated copper arsenate (CCA)-treated wood structures, and the potential for unintentional injury. The data collected in this study will be used to develop new distributions of exposure and risk, and to examine changes in the occurrence and magnitude of these exposures and risks over time, where baseline data is available. This joint activity between EPA and HUD will save significant public funds, reduce the survey response burden on the public, and substantially reduce the time needed to get data needed by both agencies for their ongoing primary and secondary prevention activities. Specifics on how the analyses of samples are performed can be found in Tasks 19580 (metals & bioavailability), 3945 (perfluorooctanoic acid (PFOA) and precursors of PFOA in house dust) and 15565 (pesticides).</p> <p><i>Purpose/ Objective:</i> The main goal of this task is to collaborate with HUD/OHHLHC to produce the first national survey assessing potential housing related exposure to analytes of interest to both agencies such as pesticides, phthalates, perfluorinated compounds, and arsenic concentrations found near CCA-treated wood structures. The AHHS will assess potential residential exposures for the general population, including but not limited to children</p>	<p>(1) anticipating, identifying, and setting priorities for managing environmental problems to protect ecological and human health; (2) developing policies to address the selected environmental priorities; and (3) implementing the policies to achieve better environmental outcomes.</p>	<p>Alan Hecht – ORD Director of Sustainability</p> <p>Randy Wentsel, ORD National Program Director – Contaminated Sites/RCRA and Sustainability</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
	<p>and other susceptible subpopulations, to these key hazards.</p> <p><i>Point of Contact:</i> petterson.lynne@epa.gov; Bradham.Karen@epa.gov, Coppedge.Easter@epa.gov, principal investigators</p>		

Objective 3: Revitalizing brownfields and contaminated sites

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
<p>Contaminated Sites MYP http://www.epa.gov/osp/myp.htm#cs</p> <p>(1) By 2010 improve the range and scientific foundation for contaminated sediment remedy selection options. (2) By 2010, ORD will provide documented performance and cost information for at least 8 alternatives to pump and treat remedies and at least 6 tools for characterization and assessment. (3) By 2010, 25 tools and methods will be provided that will allow the Agency to accurately and efficiently assess, remediate, and manage the soil and land in a healthy, productive, and sustainable state. (4) By 2010, provide 40 scientific tools, methods, and models, as well as technical support necessary to characterize the nature and extent of multi-media site contamination; assess, predict, and communicate risks to human health and the environment; evaluate innovative characterization and remediation options; and develop testing protocols, risk management strategies, and identify fate and effects of oil spills.</p>	<p>Technical Outreach Services for Communities and Technical Assistance to Brownfields http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=54330&ActType=project&keywords=brownfields</p> <p><i>Description of Activity (or Product):</i> There are many activities that can be conducted to assist communities. These include (1) conducting technical presentations and seminars, (2) reviewing technical documents, (3) providing literature related to treatment technologies, (3) conducting workshops related to risk, (4) providing assistance with redevelopment projects (such as field demonstrations), (5) participating in public meetings, (6) assisting the community group develop its capacity to monitor sites - such as determining access to monitoring data, and (7) providing information on health and environmental risk of applicable contaminants. The Rocky Mountain Regional HSRC will provide assistance in many ways - through the development of print-based materials (such as creation of handbooks or compilation and review of literature), through face-to-face meetings, seminars, and workshops, or through use of technologies (such as the Internet including development of Web sites, Internet-based instruction, or electronic newsletters). Each of these methods will be used as appropriate to help communities better understand technical issues and make informed choices. In addition to providing assistance to communities in Region 8 facing issues dealing with all types of contaminated sites, the Rocky Mountain Regional HSRC will assist other regional HSRC's dealing with issues concerning mining wastes and acid mine drainage.</p> <p><i>Purpose/ Objective:</i> The Technical Outreach Services for Communities (TOSC) program was created in 1994 to provide technical assistance to communities impacted by hazardous wastes. Through this program, the Rocky Mountain Regional HSRC will provide educational resources to help citizens gain a better understanding of the environmental problem allowing them to make informed decisions and participate more fully in activities that affect their communities.</p> <p>This RMRHSRC will work with communities and other stakeholders to meet community needs. Example activities include: (1) creating technical assistance materials or information community members about existing materials, (2) providing technical information to help community members become active participants in cleanup and environmental development activities, (3) reviewing and interpreting technical documents and other materials, and (4) sponsoring workshops, short courses, and other learning experiences as needed.</p> <p><i>Point of Contact:</i> lasat.mitch@epa.gov, project officer</p> <p>Brownfields Redevelopment Research http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=84968&ActType=project&keywords=brownfields</p>	<p>Improve and demonstrate EPA capability to assess environmental conditions and determine the relative risks that contaminated land poses to health and the environment. The Contaminated Sites MYP describes ORD problem-driven research supporting three Office of Solid Waste and Emergency Response (OSWER) trust fund programs for which research is authorized: Superfund (SF), Leaking Underground Storage Tank Corrective Action (LUST CA) and the Oil Spills Program.</p>	<p>Randy Wentzel, ORD National Program Director – Contaminated Sites/RCRA and Sustainability</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
	<p><i>Description of Activity (or Product):</i> Technical decisions should be based upon scientifically sound approaches of known quality. Unfortunately, there may not be sufficient time, for example, to do extensive site characterization. Also, decisions made on the basis of "thin" data sets need to be understood in the context of those data limitations. As a result of interaction with colleagues on the ORD Brownfields research team and representatives of the EPA brownfields program, the following projects have been planned: 1) Development of a guide for model evaluation, 2) Extension of the on-line calculators for more chemicals, capture zone modeling, and chlorinated solvent transformation, 3) Generation of environmentally-related data on illegal drug lab chemicals. It is intended to be preliminary work whereby knowledge of brownfields is gained, while at the same time producing useful products. Currently, ORD has no budgeted brownfields program, but the program office has been willing to fund targeted projects that it feels will produce useful results.</p> <p><i>Purpose/ Objective:</i> To develop technical tools that can be used to improve confidence in decision-making at Brownfields sites with respect to known, or suspected, contamination from petroleum hydrocarbons, chlorinated solvents, industrial chemicals, and chemicals associated with the illegal production of street drugs.</p> <p><i>Point of Contact:</i> petterson.lynne@epa.gov; weaver.james@epa.gov, principal investigator</p>		
<p>Resource Conservation and Recovery Act (RCRA) MYP http://www.epa.gov/osp/myp.htm#cs</p> <p>(1) Improve waste management for industrial and municipal wastes to enhance sustainability by providing at least 15 reports including technical support. (2) Support scientifically defensible and consistent decision-making for RCRA waste management and corrective action by providing a tested multimedia modeling system with at least 10 supporting technical reports, and technical support.</p>	<p>EPA New England Toxic Sediments Inventory http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=72673&ActType=project&keywords=RCRA</p> <p><i>Description of Activity (or Product):</i> This study proposes to integrate historical and current data into a manageable information system that tracks specific toxic chemicals in both Superfund and RCRA sites and allows correlative analysis with regards to remedial responses based on site assessment data.</p> <p><i>Purpose/Objective:</i> The Regional Applied Research Effort (RARE) provides the Regions with a mechanism to address near term research needs through an ORD Laboratory/Center. Any applied research project that a Region identifies and that an ORD laboratory has the expertise to carry out will be considered if the three following conditions are met: 1) projects must be funded through an ORD Laboratory or Center, 2) the project must fall within with defined mission of the selected ORD Laboratory/Center, and 3) proposals must be research-oriented.</p> <p>The regional database will be accessible to many users both inside and outside of government and provide a baseline level of sediment quality for future users. The data will be of use to regional, state, and local watershed managers seeking information on environmental quality, to help target priorities for protection and restoration or to determine trends over time. In addition, for the first time, CERCLA and RCRA Corrective Action environmental data will be integrated into a regional database. These data could promote targeted studies to further assess clusters of "Tier 1" sites (high likelihood of adverse effects) for cumulative impacts, or research into better understanding the links between contaminant exposure and effects at highly contaminated sites or watersheds. Based on the spatial statistical analysis, the database could also assist in the design of regional monitoring programs.</p>	<p>EPA will focus its RCRA-related research primarily on treatment processes for hard-to-treat chemicals; innovative containment technologies; resource conservation; and site-specific technical support and state-of-the-art methods, tools, and models for addressing priority RCRA management issues.</p>	<p>Randy Wentzel, ORD National Program Director – Contaminated Sites/RCRA and Sustainability</p>

Activities (MYP)	Output (one or more examples among many)	Outcomes	Point of Contact
	<i>Point of Contact:</i> janes.deborah@epa.gov		

Goal 5: Compliance and Environmental Stewardship

Objective: Ensuring compliance

Activities (MYP)	Output (only one example among many)	Outcomes	Point of Contact
Science and Technology for Sustainability MYP http://www.epa.gov/osp/myp.htm#p2 under development	<p><u>Using Market Forces to Implement Sustainable Stormwater Management</u> http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/7542</p> <p><i>Description of Activity (or Product):</i> Population growth, urbanization and inadequate infrastructure have impaired natural systems in Portland. Traditional responses (public infrastructure and regulation of private development) have proven inadequate to meet the accumulated demands of 150 years of urbanization, much less the new demands that will come with increased population during the next 35 years. Portland’s immediate response is to increase sanitary sewer and stormwater system capacity through the construction of large tunnels. The \$1.4 billion investment will eliminate current deficiencies in system capacity and manage about 15 percent of the anticipated capacity required by new development planned through 2040. These investments will test the financial carrying capacity of Portland ratepayers and place increasing pressure on a fragile economic recovery in the city, region and state. To address community, economic and environmental concerns, Portland seeks to investigate the feasibility of preventative approaches that, when combined with good science and hard engineering, could result in measurable environmental and economic benefits. Central to this effort is the evaluation of non-traditional market-based solutions that could help manage future system demands as Portland’s central city grows between 2011 and 2040.</p> <p><i>Purpose/ Objective:</i> Four project objectives are: (1) Determine the feasibility of applying a market-based stormwater management system in an established urban area with a constrained sanitary and stormwater collection system. (2) If it is determined to be feasible, develop a model trading system that focuses on improved watershed conditions and stormwater management in a highly urbanized area. (3) Demonstrate how the trading system works through pilot implementation. (4) Report on, transfer technology and share information about lessons learned with others.</p> <p><i>Point of Contact:</i> Bauer.Diana@epa.gov</p>	Currently Under Development	Randy Wentzel, ORD National Program Director – Contaminated Sites/RCRA and Sustainability
Economics and Decision Sciences MYP http://www.epa.gov/osp/myp.htm#socio currently under development	<p><u>Environmental Management Strategies and Corporate Performance</u> http://cfpub.epa.gov/si/osp_sciencedisplay.cfm?dirEntryID=57594&ActType=project&keywords=Compliance http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/5553/report/2004</p> <p><i>Description of Activity (or Product):</i> The objective of this research is to assess how and when environmental management practices impact environmental and corporate performance. Strategic management theory connects management practices with corporate performance through two avenues: cost reduction and value creation. This bifurcation leads to the formulation of two hypotheses connecting environmental and corporate performance. The first hypothesis identifies the set of factors that determines the influence a cost</p>	Economics and decision sciences research is essential to understanding environmental behaviors. This research informs state and federal environmental agencies on how best	Alan Hecht – ORD Director of Sustainable Development Randy Wentzel, ORD National Program Director – Contaminated

Activities (MYP)	Output (only one example among many)	Outcomes	Point of Contact
	<p>reducing environmental strategy has on corporate performance. In this case, we hypothesize that firms are able to improve corporate performance by pursuing environmental objectives if the costs associated with poor environmental performance are sufficiently responsive to the actions of the firm. The second hypothesis identifies the set of factors that influences corporate performance if the firm pursues a product/process differentiation strategy along environmental dimensions. In this case, we hypothesize that firms are able to improve corporate performance by pursuing environmental objectives if the firm is able to credibly demonstrate improved environmental performance to its customers and there is sufficient demand for improved environmental performance.</p> <p><i>Purpose/ Objective:</i> The objective of this research project is to assess the economic and institutional drivers of the adoption of environmental management practices beyond regulatory compliance. The project is divided into two complementary parts. The first part consists of collecting original data through a survey of environmental managers in 3,000 manufacturing facilities in 8 industries in the United States. The second part of the research project is a detailed analysis of the electric utility sector through a combination of publicly available databases.</p> <p><i>Point of Contact:</i> Koehler.dinah@epa.gov , project officer</p>	<p>and most cost-effectively to accomplish three goals: (1) anticipating, identifying, and setting priorities for managing environmental problems to protect ecological and human health; (2) developing policies to address the selected environmental priorities; and (3) implementing the policies to achieve better environmental outcomes.</p>	<p>Sites/RCRA and Sustainability</p>

Cross-Cutting Strategies:

Objective: Internal Capacity-Building

Activities (Near-term)	Output	Outcomes	Point of Contact
<p>Distribute/facilitate Environmental Justice On-line training, and hold discussion sessions, by L/C/O, to explore ways to more fully integrate EJ principles/priorities into ORD's activities.</p>	<p>A key component to the FY04 EJ Action Plan was to offer an on-line training course to all ORD employees. This action item was completed in FY05. A memo was issued from Senior Management to all ORD staff, encouraging each ORD employee to take the on-line training course, Introduction to Environmental Justice, offered by OEJ. During FY06 we will be holding discussion sessions in each Lab, Center and Office to garner feedback as to how we can more fully, and effectively, integrate EJ principles and priorities into ORD's day-to-day functions and programs. These discussion sessions will be led by members of the ORD EJ Communications Network (ComNet). Summaries of the discussion sessions will be collected, compiled and communicated to Senior Management.</p>	<p>ORD employees will gain a better understanding of the principles of EJ, so that we can do a better job of integrating those principles into our research and other programs.</p>	<p>Jason Edwards, EJ Coordinator, ORD edwards.jason@epa.gov</p>
<p>Continue support of outreach and community-based programs. (i.e. Community Involvement Conference, NEJAC)</p>	<p>ORD will continue to support the Agency through the NEJAC as needed including presentations and material needed and input to Agency responses to the NEJAC.</p> <p>During FY04 and FY05, ORD supported the Agency's outreach programs by participating in Agency-sponsored events such as the National Community Involvement Conference (CIC), held in Denver, CO and Buffalo, NY, respectively. ORD made direct financial contributions, as well as providing FTE support to the Selection and Keynote Committees. The CIC will be held in Milwaukee, WI in June 2006. ORD will continue to support the CIC by Co-Chairing the Selection Committee, as well as participating in several other phases of the conference planning, and</p>	<p>The primary goal of this action is the continuation of ORD's community outreach and involvement efforts.</p>	<p>Jason Edwards, EJ Coordinator, ORD edwards.jason@epa.gov</p>

	providing financial support. Additionally, ORD will make increased efforts to encourage participation by its researchers and grantees.		
Link current/future research goals/priorities with EJ priorities via stronger communication with the Agency's Program Offices.	During FY06, ORD will continue its efforts to strengthen the lines of communication between ORD and the Program Offices. The first step in this important action item is to more pro-actively engage the Program Offices in a dialogue, so that the Program Offices can make better use of ORD's existing research and programs. This will be achieved by ORD's regular attendance on the monthly EJ Coordinators' teleconference, and increased efforts to maintain closer communications on EJ-related activities. This closer communication will facilitate increased timeliness, and better information-sharing, to interested parties, outside of ORD.	The primary goal of this action is to more actively engage the other Offices in the Agency. We will achieve greater utility of our research and other programs, by the other Offices throughout the Agency.	Jason Edwards, EJ Coordinator, ORD edwards.jason@epa.gov
Institute ORD EJ Honor Award.	The ORD Environmental Justice Award will be instituted for the FY06 award cycle. The award will be given during ORD's annual award ceremony. This newly-instituted award recognizes those ORD employees who make an exceptional contribution, accomplishment or achievement in integrating EJ-related principles into the science, and programs, being performed within ORD. As the Agency leader for science and research, the contributions of ORD staff takes on greater importance in helping EPA achieve its science-related strategic goals, as related to environmental justice. This award specifically recognizes those employees who have excelled in our efforts to bring EJ concerns to bear, within our research and other programs.	The primary goal of this action is to encourage ORD personnel to consider the EJ implications of ORD's programs.	Jason Edwards, EJ Coordinator, ORD edwards.jason@epa.gov
Continue to sponsor operation of the National EPA-Tribal Science Council. The National EPA-Tribal Science Council, commonly referred to as the Tribal Science Council (TSC), was created in partnership with tribal representatives to help integrate Agency and tribal interests, specifically with respect to environmental science issues. The TSC provides a forum for tribes and EPA to identify priority environmental science issues and collaboratively design effective solutions.	The Tribal Science Council seeks to: Develop a better understanding of the priority science issues of tribes from across the nation and EPA's ability to address these issues and consider them as part of its formal planning process; reach consensus on collaborative approaches for addressing priority scientific issues; share EPA scientific products or activities that could help address the priority scientific issues of tribes; promote partnerships between tribal and EPA scientists in the development and application of sound science; and facilitate the communication and coordination with other Agencies and organizations to more effectively respond to issues.	The Council seeks to increase tribal involvement in EPA's scientific activities - building bridges between tribal and Agency programs.	Claudia Walters walters.claudia@epa.gov