FY 2008 President's Budget for ORD, FY 2008-2012 Strategic Directions for ORD

Presentation to the
EPA Science Advisory Board
Executive Committee

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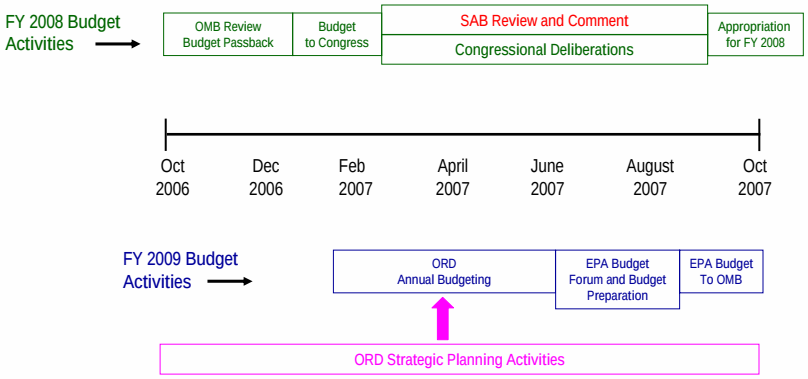
Presentation Overview

- FY 2008 President's Budget for ORD
- ORD Strategic Planning Process
- Four Key Challenge Areas
- Conclusions

Planning and Budgeting Activities: 1 Oct. 2006 – 30 Sept. 2007

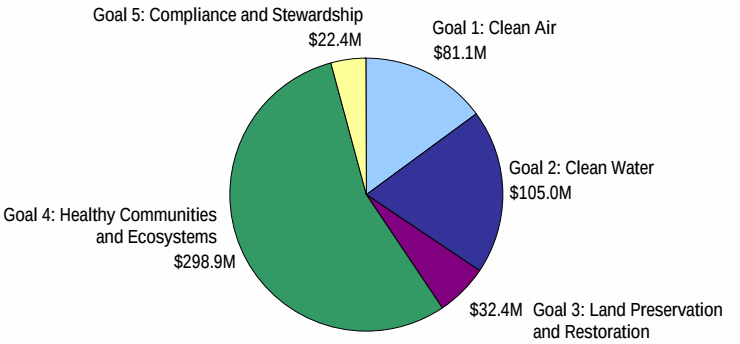


Research Areas for FY 2008 Budgeting

- Air
- Drinking Water
- Water Quality
- Land Preservation and Restoration
- Pesticides and Toxics
- Endocrine Disruptors
- Human Health Risk Assessment
- Global Change
- Homeland Security
- Human Health and Ecosystems
  - Human Health
  - Ecosystems
  - Nanotechnology
  - GEOSS/AMI
  - Mercury
- Science and Technology for Sustainability
- Computational Toxicology

ORD's FY 2008 President's Budget, by Goal $539.8M

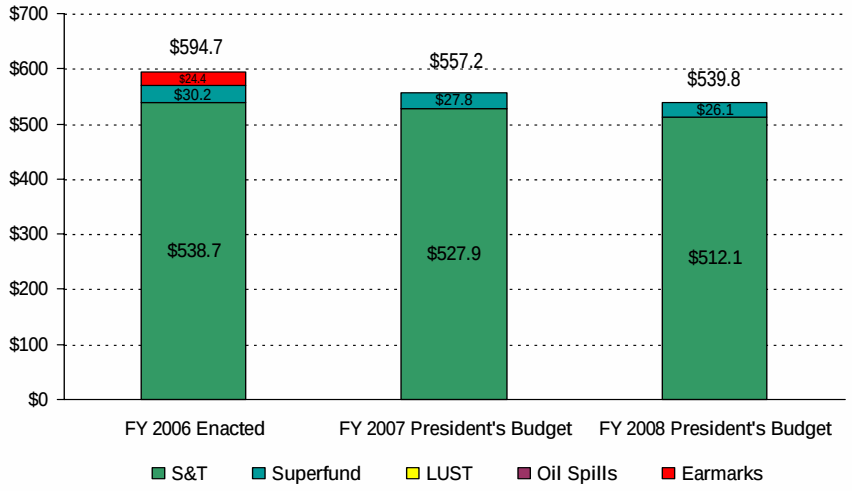
(Total All Appropriations*)



*Includes S&T, SF, Oil, and LUST

ORD Budget by Appropriation

(Dollars in Millions)



Summary of Major Increases in FY 2008 President's Proposal

- Human Health Risk Assessment (Goal 4) *+$4.5M*
- Air (Goal 1) *+$3.3M*

Human Health Risk Assessment: +$4.5M (of $38.3M)

Additional funding to:

- Develop and implement a new process to produce "Integrated Science Assessments" (formerly Air Quality Criteria Documents) to support five-year NAAQS reviews
- Support the development of quantitative risk assessment methods to allow improved analysis and characterization of uncertainty in human health risk assessment
- Enhance consultation with the National Academy of Sciences on difficult and complex risk assessment issues

Air: +$3.3M (of $77.7M)

Additional funding to:

- Support research on air pollution near roads, including characterization of emissions near roads, study of the extent of human exposure to and the health effects from these emissions, and research on the effectiveness of potential controls
- Support research to aid in the development of emission inventories, which estimate air pollutant emissions by source type
- Continue interagency agreement with NOAA to further develop the Community Multi-scale Air Quality modeling system, which forecasts U.S. air quality at regional and national scales

Summary of Major Decreases in FY 2008 President's Proposal

• Ecosystems (Goal 4)	*-$11.0M*
• Human Health (Goal 4)	*-$ 4.0M*
• Homeland Security (Goal 4)	*-$ 3.9M*
• Economics and Decision Sciences (Goal 5)	*-$ 2.5M*
• Land Preservation (Goal 3)	*-$ 1.7M*
• Pesticides and Toxics (Goal 4)	*-$ 1.4M*

Ecosystems Research: -$11.0M (of $79.2M)

- Environmental Monitoring and Assessment Program (EMAP)
  - Eliminate data collection in the Central Basin (lower Mississippi River) and Gulf of Mexico wetlands
  - Stop long-term verification studies of surface water recovery from acid deposition in the NE U.S.
  - Reduce support to states for Regional EMAP (REMAP) projects
- Other Impacts
  - Eliminate EPA's contribution to the National Land Cover Database, a collaborative federal effort that EPA relies on for data
  - Eliminate funding for ECOTOX, a web-based system of the ecological effects of toxic chemicals
  - Reduce efforts to evaluate effectiveness of restoration actions
  - Reduce assistance to states for development of their watershed management plans, including the establishment of Total Maximum Daily Loads
- *EPA will continue to fund critical research on the restoration of large floodplain rivers and to develop decision-support tools that enable managers to balance ecosystem requirements with human needs. To advance environmental decision making, the Ecosystem Research Program will emphasize the development of methods to optimize the services provided by ecosystems.*

Human Health Research: -$4.0M (of $60.8M)

- Reduce efforts on susceptible subpopulations, including:
  - Exposure and effects in children, adolescents, and older adults
  - Cumulative risk
  - The National Children's Study (NCS)
- Reduce support for research on exposure models, including:
  - Application of physiologically-based pharmacokinetic (PBPK) modeling for high priority chemicals
  - Improving resolution of existing exposure models
- *EPA will continue to fund critical research to address the health risks of susceptible subpopulations (such as mechanistic work, aggregate and cumulative risk assessments, and the Children's Environmental Health Centers) and will meet its critical performance commitments.*

Homeland Security: -$3.9M (of $39.5M)

- Delay validation of analytical methods for chemical, biological, and radiological agents
- Reduce work on developing restoration techniques for release of a dirty bomb in an urban setting
- Reduce work on the evaluation of treatment and disposal options for agricultural biomass
- Reduce efforts to evaluate health risks from decontamination by-products

Economics and Decision Sciences (EDS): -$2.5M (of $2.5M)

- Eliminates ORD's research in this area.
- Additional resources are provided elsewhere (EPA's National Center for Environmental Economics) to support priorities in regulatory/economic management and analysis

Land Preservation: -$1.7M (of $34.1M)

- Decrease research related to the treatment of inorganic contaminated sediments, evaluation of existing remedies, and development of new remedies

Pesticides and Toxics: -$1.4M (of $26.2M)

- Reduce efforts to:
  - Develop a high throughput approach to initially screen compounds for neuro- and immuno-toxicity
  - Support probabilistic ecological risk assessment
  - Complete a model to assess the allergenicity of plant-incorporated protectants.
- Reduce assessment of the impacts of genetically modified plants, provide less data on degradation products, and perform fewer treatment studies of pesticides in drinking water

ORD Responses to SAB Comments

- The SAB has expressed concerns over declines in ORD's budget, in particular funding for ecosystems protection research.
  - *EPA believes that the FY 2008 proposed budget addresses the highest priority environmental research needs, consistent with available resources.*
- The SAB has commented that ecological services is an important emerging environmental issue.
  - *The Ecosystems Protection MYP is being revised to reflect ecological services as basic to identifying meaningful research outcomes.*
- The SAB has expressed concern that current homeland security research programs are not sufficiently informed by the behavioral and social sciences.
  - *ORD is working with the DHS Centers of Excellence (Johns Hopkins & USC) to become better informed about the behavioral and social sciences, to improve effective management and communication of EPA's homeland security research and risk assessments.*

ORD Responses to SAB Comments (continued)

- The SAB's concern that homeland security research could redirect funds from other research areas has fostered ORD's commitment to dual use of our homeland security research.
- ORD appreciates the SAB's concern regarding funding levels for the Science to Achieve Results (STAR) research grants program, and remains committed to maintaining the integrity of this program and continuing to strengthen the synergy of STAR with the intramural program.
- The SAB's support for the nanotechnology initiative is reflected in ORD's continuing development of this research area.
- EPA's continued investment in computational toxicology and bioinformatics is responsive to the SAB's recommendations.
- The SAB recommended strengthening research collaborations with other institutions. ORD's responsiveness to this advice is illustrated by the examples provided on the following slide.

ORD Research Collaborations (examples)

- Children's Health Centers. This EPA/NIEHS partnership has funded eight university-based research centers focused on causes and mechanisms of children's disorders having an environmental cause.
- Environmental Bioinformatics Research Centers. Centers in NJ and NC are working with EPA scientists on developing novel analytic and computational methods, creating efficient user-friendly tools to disseminate the methods to the wider community, and applying them to data from molecular toxicology and other studies to improve quantitative risk assessments.
- Nanotechnology. Joint solicitation with EU on research; participating in OECD effort to coordinate and harmonize approaches to nanotechnology environmental, health, and safety issues.
- National Homeland Security Research Center. Working closely with the DHS to ensure that our efforts support DHS priorities. Also collaborating with the Edgewood Chemical and Biological Center, the Technical Support Working Group, the Army Corps of Engineers, and other DOD organizations to address areas of mutual interest and concern.
- National Coastal Condition Report III. This soon-to-be-released third in a series of environmental assessments of U.S. coastal waters and the Great Lakes represents collaborations among EPA, NOAA, USGS, USFWS, and twenty-four coastal state agencies.
- Climate Change Science Program. Completing two ORD-led synthesis and assessment products: "Preliminary review of adaptation options for climate-sensitive ecosystems and resources" and "Analyses of the effects of global change on human health and welfare and human systems." Coordinating with the DOE, NASA, NOAA, USGS, and NIH.

Strategic Directions: Key Needs for SAB Advice

- Where we should be in 2012
  - Areas of increased emphasis
  - Areas of decreased emphasis
- Scientific considerations in getting there
  - Strategic workforce planning
  - Efficiency opportunities

Evolving ORD's Research Program: Role of Expert Advice and Evaluation

Decision Inputs

- Programs and Regions
- EPA Strategic Plan
- Administration's Priorities
- Congressional Mandates
- BOSC Reviews
- SAB, NAS, other External Advice
- Stakeholders
- NPDs, SC, MC, EC

ORD Research

Guided by Strategic Directions

Adjusted per Annual Budget Decisions

Applied to Inform Environmental Decisions

Evaluation

- Program and Regional Office Feedback
- BOSC Program Evaluations
- NAS, NAPA, other Advisory Bodies
- PART Reviews

Science Advisory Board Reviews

FY 2006

- Air Quality Criteria Document for Lead
- Air Quality Criteria Document for Ozone
- Various IRIS Assessments
- Evaluation of the Carcinogenicity of Ethylene Oxide
- Arsenic Carcinogenicity
- ReVA Program
- Framework for Inorganic Metals Risk Assessment
- Update to the 1992 Guidelines for Exposure Assessment
- Report on the Environment 2006
- Homeland Security Science

FY 2007

- All-Ages Lead Biokinetic Model
- Ethylene Oxide Carcinogenicity Assessment
- Report on the Environment 2007
- Acute Inhalation Exposure-Acute Reference Concentration Development
- Expert Elicitation White Paper
- Health-Based Provisional Advisory Levels for Homeland Security
- Various IRIS Assessments

Board of Scientific Counselors Reviews

FY 2006

- Global Change Program Review
- Water Quality Program Review
- STAR/GRO Fellowship Program Review
- Land Preservation and Restoration Program Review
- Risk Assessment Proceedings Document
- Management Multi-Year Plan Letter Report

FY 2007

- Safe Pesticides / Safe Products Program Review
- Sustainability Program Review
- Human Health Risk Assessment Program Review
- Homeland Security Program Review
- Human Health Mid-Cycle Review
- Ecosystems Mid-Cycle Review
- Drinking Water Mid-Cycle Review
- Endocrine Disruptors Mid-Cycle Review
- Particulate Matter and Ozone Mid-Cycle Review

OMB PART Reviews of ORD Programs

2003
- Pollution Prevention / New Technologies – Results Not Demonstrated
- National Ambient Air Quality Standards – Results Not Demonstrated
- Ecological Research – Results Not Demonstrated

2004
- Endocrine Disruptors Research (Joint PART with OPPTS) – Adequate

2005
- Human Health Research – Adequate
- Drinking Water Research – Adequate
- National Ambient Air Quality Standards (re-PART) – Adequate
- Ecological Research (re-PART) – Ineffective

2006
- Global Change Research – Adequate
- Land Protection and Restoration Research – Adequate
- Water Quality Research – Adequate
- Human Health Risk Assessment Program – Moderately Effective

2007
- Pesticides and Toxics Research
- Ecological Research

ORD's 2008-2012 Strategic Directions Activity

• Spring-Summer 2006	Executive-level discussion of budget scenarios
• December 2006	NPD strategic directions proposals
• January 2007	Laboratory and Center Directors' responses
• February 2007	SAB review and advice
• March-June 2007	Incorporate strategic directions into FY 2009 budgeting exercise

Proposed Strategic Directions

- Goal 1: Clean Air
  - Maintain priority for NAAQS regulatory decision support, with integrated NAAQS and air toxics programs to improve management of EPA air research as a multi-pollutant or "one atmosphere" program
  - Provide improved assessments of source-to-effects linkages
- Goal 2: Clean and Safe Water
  - Focus drinking water research on pathogens, unregulated contaminants, distribution system (infrastructure) problems and source water protection
  - Emphasize watershed management to support the development of integrated water quality and quantity modeling and monitoring tools
  - Support regulatory needs for revising aquatic guidelines and criteria, including research on biological condition for tiered aquatic life uses
  - Develop approaches to characterize, control, and manage point and non-point sources of water quality impairment
- Goal 3: Land Protection and Restoration
  - Evaluate the most problematic site types, contaminants, and exposure pathways
  - Provide tools for EPA's Resource Conservation Challenge

Proposed Strategic Directions (continued)

- Goal 4: Healthy Communities and Ecosystems
  - Advance molecular and computational methods for testing and screening
  - Shift the primary focus of the human health research program from "reducing uncertainties in risk assessment" to "developing and linking indicators of risk" along the source-exposure-effects-disease continuum, to demonstrate reductions in human risk
  - Make ecosystem services the strategic focus for the ecology research program
  - Continue to provide high quality, scientifically credible human health assessments to EPA's program and regional offices
- Goal 5: Compliance and Environmental Stewardship
  - Develop decision tools that address sustainable outcomes and demonstrate those tools in real-world applications
  - Continue to support innovative technologies through such programs as Small Business Innovation Research program and the P3 Student Design Competition

SAB Challenge Area: *Global Climate Change*

- ORD's Global Change research is planned in conjunction with the U.S. Climate Change Science Program (CCSP).
- CCSP has identified 21 synthesis and assessment products (SAP) to inform research planning and policy making.
  - ORD is the lead for 2 SAPs and contributes to 9 others
    - SAP #4.4, "Review of adaptation options for climate sensitive ecosystems and resources"
    - SAP #4.6, "Analyses of the effects of global change on human health and welfare and human systems"
- ORD is also the lead for the CCSP's goal of improving decision making and adaptive management. ORD products will include:
  - A decision assessment to identify different classes of climate-sensitive decisions in different regions of the country, and to evaluate the returns from providing better scientific information to inform those decisions
  - An NRC study, co-sponsored by NOAA, to better understand what effective decision support entails and how to evaluate our effectiveness in providing it

SAB Challenge Area: *Sensitive Populations*

- Epidemiologic studies have suggested that individuals with underlying chronic diseases that impact the cardiovascular system, such as diabetes, are more susceptible to the effects of air pollution. EPA is conducting clinical studies of air pollutants on individuals who are in the early stages of these chronic diseases.
- Risk assessments include health impacts on sensitive populations in the development of Maximum Contaminant Level Goals and Maximum Contaminant Levels during review and development of drinking water regulations.
- To protect children, EPA is developing assays to screen chemicals to understand their potential for developmental neurotoxicity.
- To understand pollutant-disease linkages, EPA is developing protocols to identify genetic changes that increase responsiveness or contribute to the early pathogenesis of disease.
- EPA is conducting studies to understand how environmental pollutants may be increasing the incidence of asthma in children.
- To protect children and the elderly, EPA is conducting research to understand the exposure-related and biological basis for increased vulnerability.

SAB Challenge Area: *Urban Sprawl*

- ORD researchers are studying landscape indicators for pesticides, nutrients, and toxic chemicals in stream water and sediments.
  - ORD developed the Analytical Tools Interface for Landscape Assessments to facilitate landscape analysis.
- The Regional Growth Decision Tool developed by ORD's Regional Vulnerability Assessment displays over 100 metrics, and allows users to compare between alternative future scenarios.
- ORD's drinking water research is addressing water use efficiency and the potential health and environmental consequences of water reuse programs. Research on infrastructure is also addressing urban sprawl issues in developing new design approaches for water distribution systems and wastewater collection systems.
- The Sustainable Environment for Quality of Life Project is a partnership for regional integrated planning created to address future growth around Charlotte, NC.
- ORD's Collaborative Network for Sustainability supports grantees, including:
  - City of Portland: Using market forces of implement sustainable watershed management
  - Cities 21 -- Bay Area, CA: Transforming office parks into transit villages
  - University of Maryland: Ecological sustainability in rapidly urbanizing watersheds

SAB Challenge Area: *Environmental Disasters – Hurricane Katrina and Other Natural Events*

- Lessons learned from ORD's Katrina response activities will contribute to future environmental disaster response strategies.
  - Treatment and disposal options for debris and wastes
    - Working with EPA Regions and federal and state agencies in developing alternative waste recycling, treatment, and disposal options
  - Options for management and risk assessment of asbestos wastes
  - On-site technical assistance in getting drinking water facilities back on-line
  - Assessment of ecological effects and recovery in collaboration with NOAA and USGS
  - Floodwater control options for FEMA and Army Corps of Engineers
  - Evaluations of contamination incurred from flooding
- ORD's water quality research includes research on non-point source-related health risks associated with wet weather events.
  - Addressing water quality and quantity issues

SAB Challenge Area: *Environmental Disasters – Homeland Security*

- Ongoing Research at the National Center for Homeland Security includes:
  - Developing procedures for using biological decontamination agents
  - Field testing strategies for clean-up following radiological/nuclear release events
  - Developing guidelines for creating a specially constructed government landfill for contaminated wastes
  - Developing oral and inhalation advisory levels for acute, short-term, and long-term exposure conditions for selected chemical and biological agents
  - Developing chemical quantitative structure-activity relationship models and biological agent virulence factor-activity relationship models
  - Revising and deploying databases to support the emergency response community
- Drinking water research interfaces with homeland security research to address disaster situations, including developing:
  - Real-time monitoring tools to detect chemical and biological contaminants in water
  - Technologies for production of water from contaminated sources
  - Distribution system models that can be applied to identify vulnerable areas of water distribution systems
  - Low-energy point-of-use treatment systems for emergency situations

Conclusions

- FY 2008 Budget Request for ORD calls for a 4% reduction
  - Increases for Human Health Risk Assessment and Air research
  - Largest reductions are in Ecosystems and Human Health research
- ORD and SAB are focusing on strategic approaches
  - ORD strategic proposals
  - SAB cross-cutting challenge areas
- Intent is to ensure that ORD most effectively uses its resources to:
  - Meet short- and long-term Agency decision support needs
  - Collaborate with or complement other agencies' research
  - Continue ORD's leadership in key environmental research areas