# Office of the Science Advisor
## FY2009 Accomplishments and FY2010 Goals

Public Version

October 21, 2009


# The Creation of the Science Advisor, Chief Scientist, and the Office of the Science Advisor

- EPA Administrator Christine Todd Whitman
  - Strengthening Science at the Environmental Protection Agency, 05/24/2002
- Acting EPA Administrator Linda Fisher
  - Establishment of the Chief Scientist and the Office of the Science Advisor, 07/11/2003

# The Office of the Science Advisor (OSA) Mission and Functions

- Provides leadership for cross-Agency science and science policy development and integration to promote the best use of science by the Agency.
  - The Science Advisor works across the Agency to ensure that the highest quality science is better integrated into the Agency's policies and decisions.
  - The Chief Scientist provides program management and technical support to the EPA Science Advisor both independently and by leading the OSA staff, and shares fully with the Science Advisor in planning, policy development and implementation, oversight, and direction of all cross-Agency scientific efforts.

# The Office of the Science Advisor (OSA) Mission and Functions

OSA promotes science integration through several functions:

- Science Policy Council (SPC)
- Risk Assessment Forum (RAF)
- Program in Human Research Ethics (PHRE)
- Global Earth Observations (EPA GEO, US GEO, GEO)
- Council for Regulatory Environmental Modeling (CREM)
- Forum on Environmental Measurement (FEM)
- Environmental Technology Council (ETC)

# *Influencing Agency Science and Technology Directions*

## *FY2009 Accomplishments*

# Agency Network
# System of Connections

- We build on our core competencies and through an Agency system of connections (committees and programs of more than 200 members) to achieve our accomplishments.
- OSA principle actions:
  - Bridges EPA and external collaborators and partners.
  - Listens to the needs of the policy and decision makers (external and internal EPA)
  - Facilitates the development/updating of a cross-Agency science/policy tool box
  - Facilitates the delivery of timely science and technology products, integrating efforts across the Agency where possible
  - Outreaches and communicates these Agency science and technology outcomes with environmental decision makers

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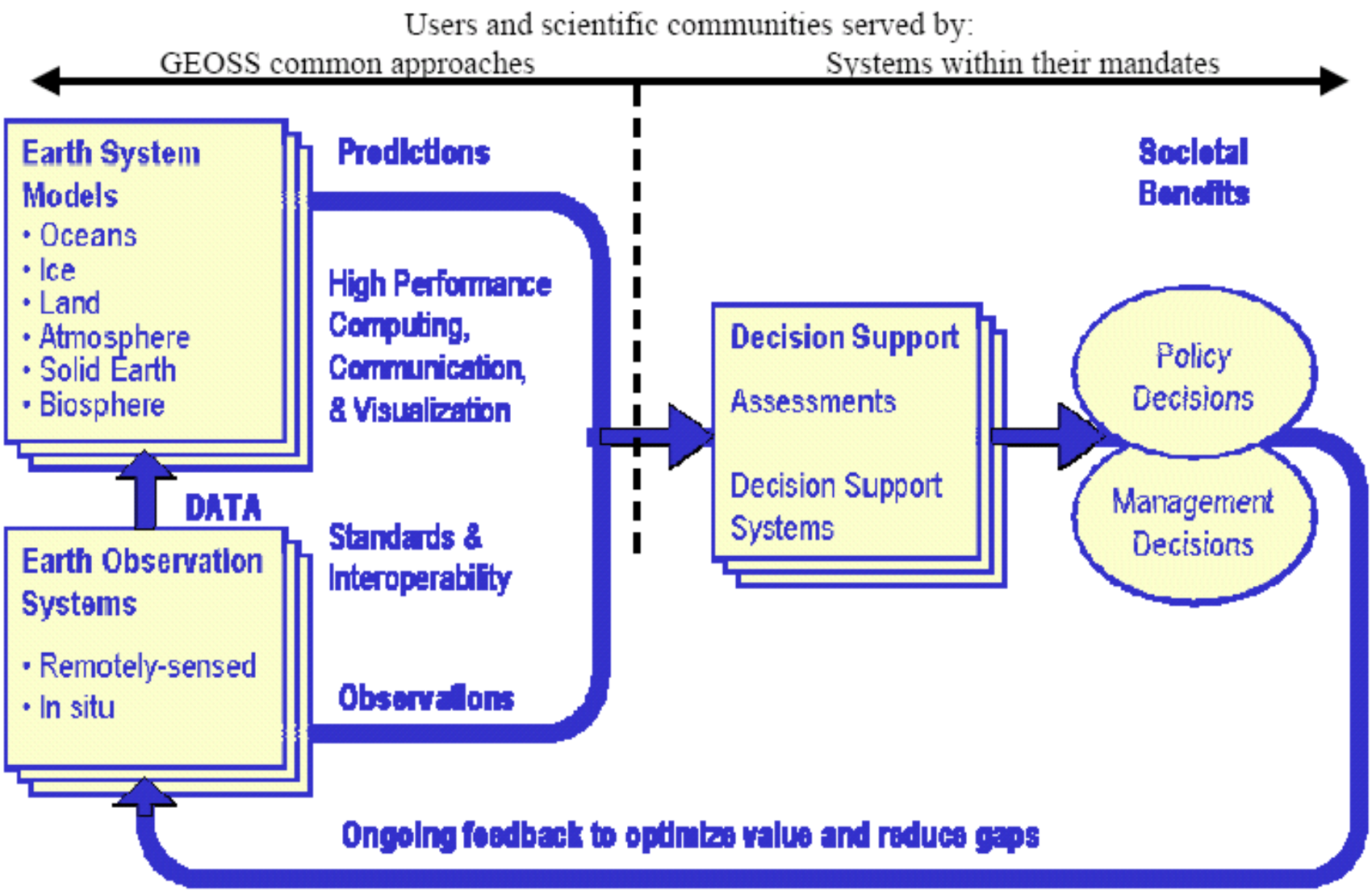
Users and scientific communities served by:
GEOSS common approaches
Systems within their mandates
Earth System Models
• Oceans
• Ice
• Land
• Atmosphere
• Solid Earth
• Biosphere
Predictions
High Performance Computing, Communication, & Visualization
DATA
Earth Observation Systems
• Remotely-sensed
• In situ
Standards & Interoperability
Observations
Decision Support
Assessments
Decision Support Systems
Societal Benefits
Policy Decisions
Management Decisions
Ongoing feedback to optimize value and reduce gaps

# FY2009 Accomplishments

- **Focus and Support 4 Principles:**
  - Strengthening Science at EPA
  - Transparency
  - Scientific Integrity
  - Administrator's Priorities


# Strengthening Science at EPA

- "Throughout EPA's history our greatest successes have occurred when policies, regulations, and decisions are based on the results of appropriate and relevant scientific research"
- "Ensure consistent cross-Agency application of strategic planning for research and use of science" – Inception of Science Advisor, 05/24/02
- "Science must be the backbone for EPA Programs" – Administrator Lisa Jackson, 01/23/09

# Transparency

- "EPA's actions must be transparent. - As your Administrator, I will uphold the values of scientific integrity, rule of law and transparency every day." Administrator Lisa Jackson, 01/29/09


# Scientific Integrity

- "Science and the scientific process must inform and guide decisions of my Administration on a wide range of issues, including improvement of public health, protection of the environment, increased efficiency in the use of energy and other resources, mitigation of the threat of climate change, and protection of national security." – President Obama, 03/09/09

# Administrator's Priorities

- Five Priorities – EPA Administrator Lisa Jackson, 01/23/09
  - Reducing greenhouse gas emissions
  - Improving air quality
  - Managing chemical risks
  - Cleaning up hazardous-waste sites
  - Protecting America's water

# Key FY2009 Accomplishments Outline and Criteria

- Cross-Agency Science Priorities document
- Climate Change and Health Initiative
- EPA Environmental Technology Innovation
- OSA housed and staffed committee accomplishments (i.e., RAF, SPC, environmental technology committees, PHRE)

# Key FY2009 Accomplishments Outline and Criteria

- Lead changes in Agency science, technology, science policy and/or organizational improvement
- Result-driven and deliver outcomes and products in a timely manner
- Sustain and/or improve resource management in an affective and financially sound way
- Improve communication and result in improving Agency science, technology, science policy and/or organization
- Lead people to advance Agency science, technology, science policy and/or organizational effectiveness

# FY2009 Accomplishments

## Cross-Agency Science Priorities document

- **SPC approved for AA-ship feedback prior to Administrator's briefing**
  - A roadmap seamlessly connecting research, application and decision making.
  - SPC approved definition of EPA "*Science" includes research, applied science, technology, and the use of scientific results for applications and decision making.*
  - Four priorities: Climate and Energy, Environmental Contaminant, Security and Emergency Response, Modernization of Infrastructure.
  - Criteria include: multi-media and multi-program implications, regulatory relevance, Economic and societal benefit, etc.
  - Framework for the priorities: Advance Environmental Science and Technology, Science to Inform Policy Decisions, and Create Tools for Implementation.

# FY2009 Accomplishments

## *Cross-Agency Science Priorities document (cont.)*

- **Impacts:**
  - Raised cross-Agency senior leadership awareness of science and technology and their importance in policy and decision-making.
  - Incrementally changed the Agency science planning paradigm – from single media to multi-media, integrating economics and social science in science planning, etc.
  - Established a sustainable Agency platform (SPC Subcommittee) to communicate critical science issues across EPA.

# FY2009 Accomplishments
## *Climate Change and Health Initiative*
## *(EPA)*

- Led the formation of a ***cross-Agency working group*** to initiate a science focus on Climate Change and Health.
- Cross-walked draft final SPC Science Priorities and on-going EPA CC&H activities to identify science gaps and needs in EPA.
- Recommended 6 multi-media and Programs (Regions) concept papers focusing on susceptible populations and environmental justice for pilot projects.
  - Health risk assessment and adaptation, health vulnerability mapping, water and vector-borne diseases, local-level air quality, regional ecosystem degradation, and health effects forest fires.

# FY2009 Accomplishments

## *Climate Change and Health Initiative*

## *(Interagency)*

- Co-lead the formation of an ***ad hoc Interagency Working Group on Climate Change and Health (IWGCC)*** (e.g., HHS, EPA, NOAA, USDA, USGCRP).
- Represent EPA interests with inputs from the Agency CC&H working group.
- A contributing author to a health and climate change science needs document that is driven by health consequences (e.g., asthma, heat stress, water-born disease).
- USGCRP, directed by OSTP, uses of the document as a pilot project to bridge climate and a societal consequences.

# FY2009 Accomplishments

## *Climate Change and Health Initiative*

## *(International)*

- Establish EPA partnership with World Health Organization to support 6 Actions in WHO Climate Change and Health Resolution that benefits EPA (e.g., burden of diseases, health indicator, economic costs of health effects, heath effects of mitigation and adaptation strategies, health outcome monitoring, and population vulnerability)
- Invited by GEO Science and Technology Council co-chairs to lead the Health Task session – First of its kind.

# FY2009 Accomplishments
## *Climate Change and Health Initiative*
## *(All)*

- **Impacts:**
  - Built Agency consensus and synergy on climate change and health science to support Administrator's priorities.
  - Raised the awareness of one of the most important societal consequences of climate change internal EPA and cross-Federal Agencies.
  - Elevated the recognition of EPA's role in health and climate and health science *domestically and internationally*.
  - Lead Agency to be forward looking at integrating climate change into risk assessment based decision making.

# FY2009 Accomplishments

## EPA Environmental Technology Innovations

*Technology is "Application of Science"*

*An Innovative Approach to Address Environmental Problems*

- Leverage and integrate existing EPA environmental technology capabilities (e.g., modeling, measurements and monitoring, technology)
- Enhance Agency technology relevant committees communications, coordination, and collaborations (e.g., from sensor technologies to decision-support tools)
  - Evaluation of nitrate sensors for groundwater remediation monitoring
  - Pathogen monitors for E. coli & total coliforms in waters
  - Testing toxic blue-green algae for microcystins in freshwater sources
  - Monitoring technologies for measuring stored CO2 from sequestration applications

# FY2009 Accomplishments

## *EPA Environmental Technology Innovations (cont.)*

- Impacts:
  - Ensure technology innovation and investment is policy and decision-making relevant
  - Incrementally change Agency paradigm to define EPA uniqueness in environmental technology endeavor

# FY2009 Accomplishments

## EPA Environmental Technology Innovations (cont.)

**Modeling**

- Supporting Model Quality and Scientific Integrity
  - Guidance Document on the Development, Evaluation and Application of Environmental Models (March 2009).
- Enhancing Communication and Transparency in Agency Model Usage
  - CREM Models Knowledge Base.
- Developing a Systematic Program to Support Integrated Modeling for Cross-Agency Science Priorities
  - Administrator Jackson sent a response to NACEPT's review of the CREM White Paper on Integrated Modeling providing support to the activities of the CREM Integrated Modeling Program (letter date April 21, 2009).
  - Collaborative Approaches to Integrated Modeling workshop was held in December 2008.
  - Formation of an internal/external Community of Practice on Integrated Modeling.

# FY2009 Accomplishments

## EPA Environmental Technology Innovations (cont.)

**Technology**

- Re-invigorated the Environmental Technology Council
- EPA Climate Change Mitigation Technology Gaps and Opportunities
- Selection of four innovative monitoring technologies for verification funding
- Development of framework for working with the venture capital community
- Evaluation of solid-state lighting as a compact fluorescent alternative

# FY2009 Accomplishments

## EPA Environmental Technology Innovations (cont.)

**Measurements and Monitoring**

- Agency Policy for Microbiological Methods of Analysis with an accompanying Technical Guidance Document for Validating Microbiological Methods of Analysis
- Implementation of Flexible Approaches to Environmental Measurement
- Draft Environmental Measurement Glossary of Terms for cross-Agency consistency (e.g., method detection, calibration)
- Annual Reporting for Agency compliance to the General Laboratory Competency Policy raised no flag this year.
- Identification of Agency representatives for national accreditation involvement.
- Draft inventory of routine or continuous monitoring programs to identify the current state of EPA monitoring information.

# FY2009 Accomplishments

## EPA Environmental Technology Innovations (cont.)

**Global Earth Observation System of Systems (GEOSS)**

- Jointly with OPP, funded two new extramural grants under the sector *Infectious Diseases IPM*.
- *"Biodiversity loss impacts global disease ecology,"* published in *Bioscience.*
- Natural Resources-Canada, EPA/OSA and Environment Canada report on *"Urbanization Impacts on the Near-Shore Environment of the Great Lakes: Transportation and Urban Form".*
- User Engagement Accomplishments
- Virtual Beach Model Builder (i.e., four bacteria prediction models being used in the Great Lakes)

# FY2009 Accomplishments
## *Risk Assessment Forum*

Projects underway:

- Harmonization in Interspecies Extrapolation: Use of Body Weight ¾ as a Default Method in Derivation of the Oral RfD
- Recommended Toxicity Equivalency Factors for Human Health Risk Assessment of Dioxin and Dioxin-like Compounds
- Technical Workshop on Population-level Ecological Risk Assessment Summary Report

- Application of Quantitative Data to Develop Data-Derived Extrapolation Factors for Interspecies and Intraspecies Extrapolation
- Probabilistic Risk Assessment White Papers
- Microbial Risk Assessment Guidance

# *FY2009 Accomplishments*
## *Risk Assessment Forum (cont.)*

Additional RAF projects

- Exposure Assessment Guidelines
- Draft framework for Determining Mutagenic Mode of Action for Carcinogenicity Cumulative Risk Assessment Issue Papers and Case Studies
- PPARα-mediated Hepatocarcinogenesis in Rodents and Relevance to Human Health Risk Assessments
- Ecological Risk Assessment Colloquium (held September 2009)

# FY2009 Accomplishments
## Science Policy Council

- Enhanced SPC processes to enable SPC members' discussions on key science policy issues.
- In response to OIG recommendation, co-chair a SPC workgroup to develop a draft: "Addendum Peer Review Handbook, 3rd Edition, Appearance of a Lack of Impartiality in External Peer Reviews."
- Developed a draft White Paper on Transparency in Risk Assessment.
- *Strategic Plan for Evaluating the Toxicity of Chemicals* (Final, approximately March 2009).
- *Expert Elicitation White Paper (External Review Draft, SAB pending).*

# FY2009 Accomplishments
## PHRE

- Maintained the Agency's Federal-wide Assurance
- Guided and supported the ongoing function of the EPA Human Studies Review Board
- Maintained a respected EPA presence in the greater human research ethics community

# FY2010 Overarching Goals

- Continue to support Strengthening EPA Science, Transparency, Scientific Integrity, and Administrator's Priorities.
- Further focus on Integrated Environmental Decision-Making (SAB), Science Priority (SPC), and Administrator's enhanced attention to environmental justice, children's health, and climate change (Administrator's 09/11/09 memo)
- Continue to support EEO/Diversity

# FY2010 Overarching Goals

- Fully staff and stabilize OSA within resources.
- Advance EPA science, technology and science policy with a focus on climate change, EJ and children's health.
- Affirm the Agency's uniqueness in environmental technology innovation and build partnership with DoE and USDA to leverage resources.

# FY2010 Future Directions
## Overarching Goals (cont.)

- Science:
  - Climate Change and Susceptible Populations
  - Climate Information (e.g., Extreme Weather) at Regional and Local Scales – Partnership with EPA and Federal Agencies.
- Science and Technology Policy:
  - Continuing to Strengthen Consistency in Risk Assessment across EPA.
  - Formulating Sustainable Framework to Engage Private Sector for Environmental Technology Commercialization.
- Technology:
  - Identifying EPA “niche” in Environmental Technology Innovation.
  - Deploying ETI Integration Actions

# FY2010 Goals
## Risk Assessment Forum

Projects underway

- Probabilistic Risk Assessment White Papers
- Application of Quantitative Data to Develop Data-Derived Extrapolation Factors for Interspecies and Intraspecies Extrapolation Exposure Assessment Guidelines
- PPARα-mediated Hepatocarcinogenesis in Rodents and Relevance to Human Health Risk Assessments White Paper
- Draft Framework for Determining Mutagenic Mode of Action for Carcinogenicity
- Microbial Risk Assessment Guidance
- Cumulative Risk Assessment Issue Papers and Case Studies

# FY2010 Goals
## Science Policy Council

- Advancing and operationalizing the Science Priorities effort.
- Finalizing *"Transparency in Risk Assessment: Science and Policy Issues"* document.
- Responding to SAB Review on draft *Expert Elicitation White Paper* and finalize document.
- Finalizing *Genomics Microarray Guidance.*
- Cross-Agency discussion on NAS risk assessment projects.
- Maximizing members' SPC input into meeting agendas emphasizing science policy issues.

# FY2010 Goals
## Environmental Technology Innovations

- **Modeling**
  - Advancing Modeling Science and Application to Ensure Model Quality
  - Improving Inter and Intra-Agency Coordination
  - Reinforcing a Culture of Transparency in Modeling
  - Enhancing Integrated Modeling for Environmental Decision Making
- **Technology**
  - Revising Charter
  - Identifying, communicating, and implementing grand challenges to encourage investment
  - Assessing and showcasing the ETC Action Team results and sensor initiative outcomes
  - Formulating sustainable EPA outreach to the EPA Venture Capital Community Summit
  - Working with Regions and OGC to develop regulatory digest to guide ETI direction

# FY2010 Goals
## *Environmental Technology Innovations (cont.)*

- **Measurements and Monitoring**
  - Developing an Agency Policy for Sampling for Biological Methods of Analysis.
  - Recommending use of an Environmental Measurement Glossary of Terms
  - Annual Reporting for Agency compliance to the General Laboratory Competency Policy with no flags
  - *"Policy for Agency Use of Accredited Laboratories"* white paper
  - Establishing priority funding areas for optimal use across the Agency and awarding of a sensor funding initiative
  - Final inventory of routine or continuous monitoring programs run, managed, and/or utilized by the Agency

# FY2010 Goals
## Environmental Technology Innovations (cont.)

- **GEOSS**
  - Developing expanded or new AMI Strategic Themes for FY2010/2011 that support the SPC Science Priorities and the EPA and GEO Strategic Plans.
  - Participating in the GEO-VI Plenary, hosted by the United States and related side events.
  - Developing a systematic approach to fund EPA GEO/GEOSS projects.
  - Sign MOU between EPA-NASA, EPA-NSF and EPA-NOAA.
  - Completing the AIRNow project in Shanghai.
  - Engaging the Regions and Offices in AMI supported integrated monitoring activities that may also involve modeling and technology.

# FY2010 Goals
## PHRE

- Maintain HSRRO protocol review and compliance oversight of all human research conducted or supported by EPA.
- Manage and support the function of the EPA Human Studies Review Board
- Continue to provide HSRRO education, consultation, and guidance services.
- Maintain PHRE's engagement with and participation in the greater human research ethics community .