

EPA Research Update for the **Science Advisory Board**

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Dec. 4, 2013

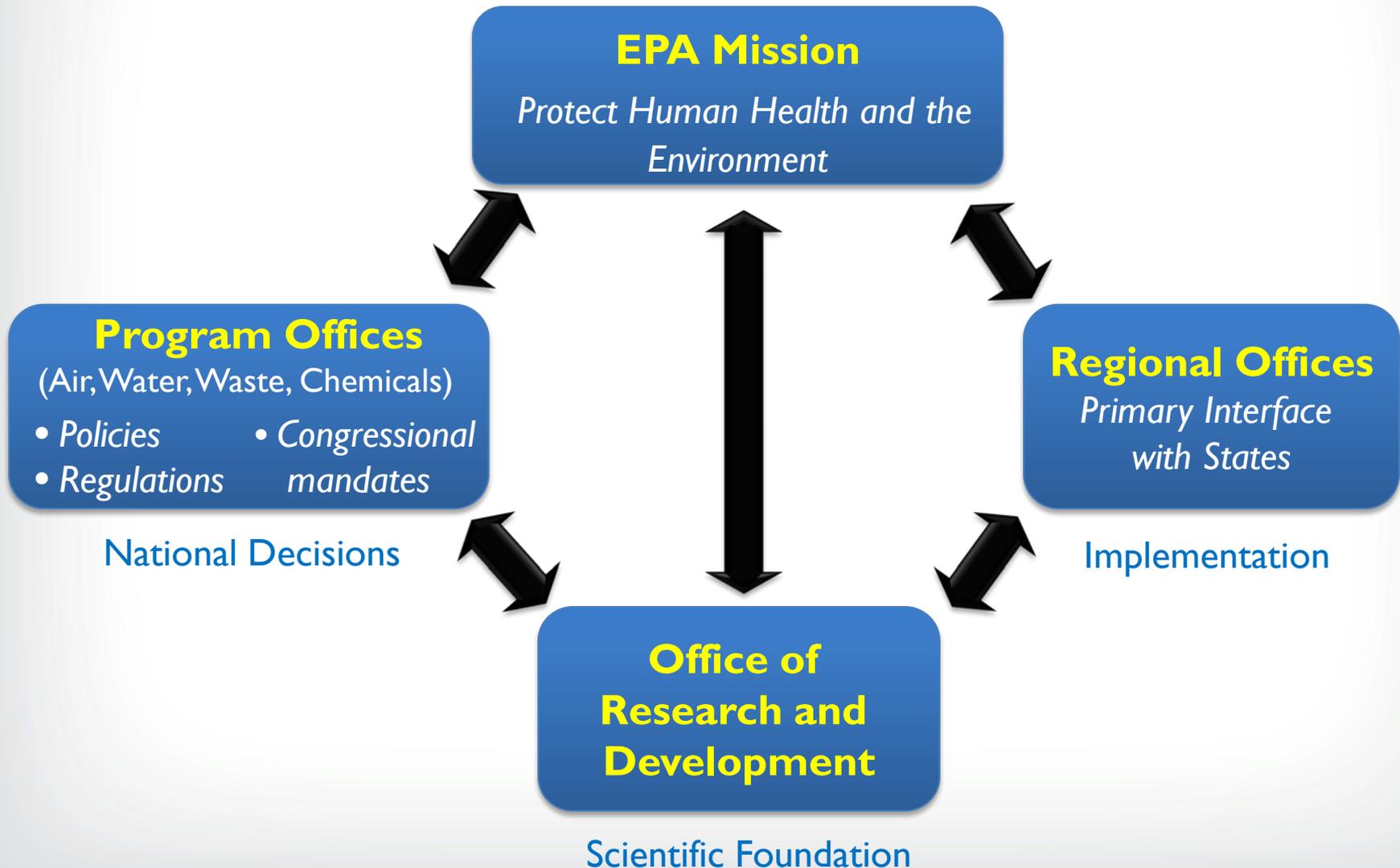


Today's Discussion

- **ORD today**
- **Science highlights from 2013**
- **Looking ahead**
- **Strategic directions meeting with SAB in 2014**



Collaboration within EPA



- **\$530 million budget**
- **13 lab and research facilities across the U.S.**
- **No FY14 budget - still operating at FY13 sequester level**
 - **FY13: \$530 m, 1848 FTE**
 - **FY14 Pres. Request: \$554 m, 1907 FTE**
- **Hiring is extremely difficult – only 8 new hires for all of ORD in FY13**
- **Workforce analysis and prioritization underway**





ORD Research Programs



Air, Climate & Energy



Sustainable & Healthy Communities



Safe & Sustainable Water Resources



Chemical Safety for Sustainability



Human Health Risk Assessment



Homeland Security



Waters “Connectivity” Report

- **State-of-the-science report on the connectivity of streams and wetlands to downstream waters**
- **Documents the role of small streams and wetlands in filtering pollutants, storing water and preventing floods**
- **Provides scientific basis for upcoming decisions on Clean Water Act jurisdiction**
- **Draft report scheduled for SAB review Dec. 16-18**





Bristol Bay Assessment

- **Characterize the biological and mineral resources of the Bristol Bay watershed**
- **Assess potential impacts of large-scale mining development on the region's fisheries and wildlife, and on Alaskan Native cultures**
- **Collaborative effort with Region 10 and EPA Office of Water**
- **Released final draft in April 2013**
- **895,000 public comments received**
- **Expect to release final report soon**





Release of Stormwater Calculator

Help communities evaluate options for stormwater management

- Green infrastructure
- Other low impact options

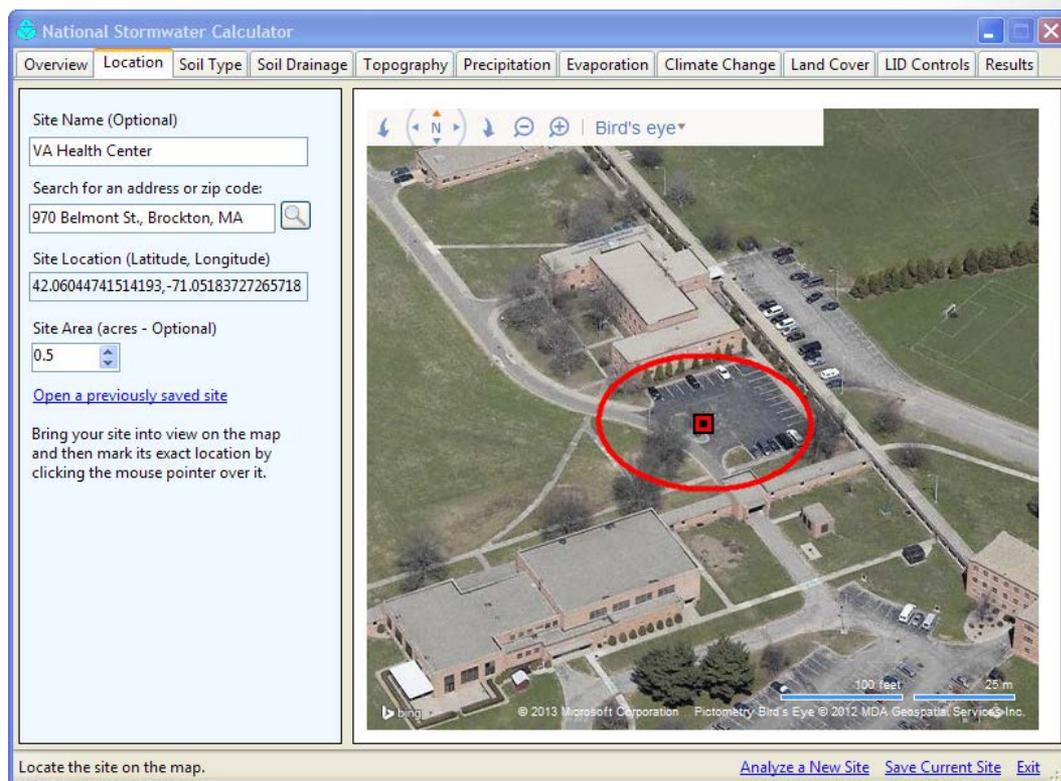
Site-specific calculations

- Uses data on local rainfall, topography, soil, etc

Next Step: climate change impacts

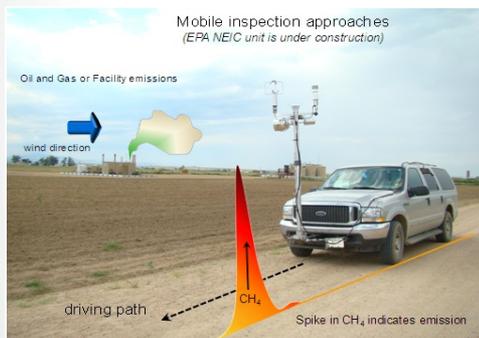
- Expand to evaluate effectiveness of stormwater management options under future meteorological conditions (Jan 2014 release)

- Component of the Climate Resilience Toolkit being developed under the President's Climate Action Plan



<http://www.epa.gov/nrmrl/wswrd/wq/models/swc/>

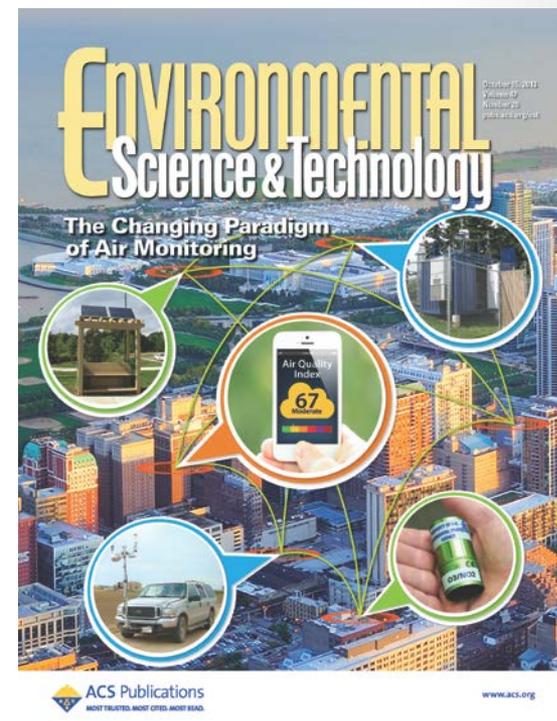
- **Developing and stimulating new technology**
- **New innovations in facility fenceline monitoring**
- **Evaluating emerging sensor technology**
- **Promoting community participation in air monitoring**
- **Satellite-based air quality measurements**



Mobile monitoring for geospatial mapping of pollutants (GMAP)



“Village Green” park bench monitors air quality



My Air My Health

U.S. Department of Health and Human Services
U.S. Environmental Protection Agency



Climate Change & Air Quality

- **GLIMPSE modeling to simultaneously evaluate air quality, ecosystem conservation, and climate change goals**

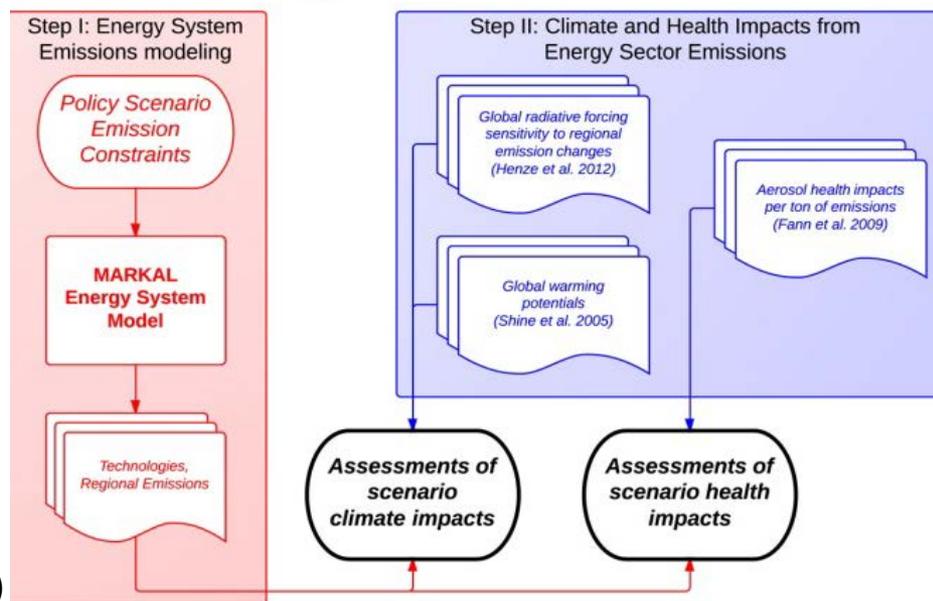
- **Wildfire increases predicted**

- Length of fire season will increase by 3 weeks by 2050, with significant increase in PM pollution (STAR grant)

- **Greater health benefits of greenhouse gas mitigation**

- Valued at \$50-\$380 per ton of CO₂, much higher than previously thought (STAR grant)

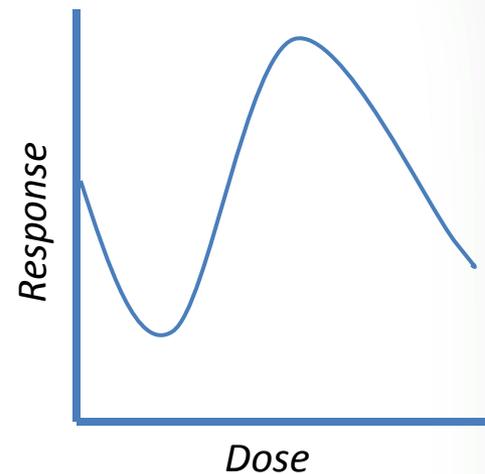
The GLIMPSE Integrated Framework





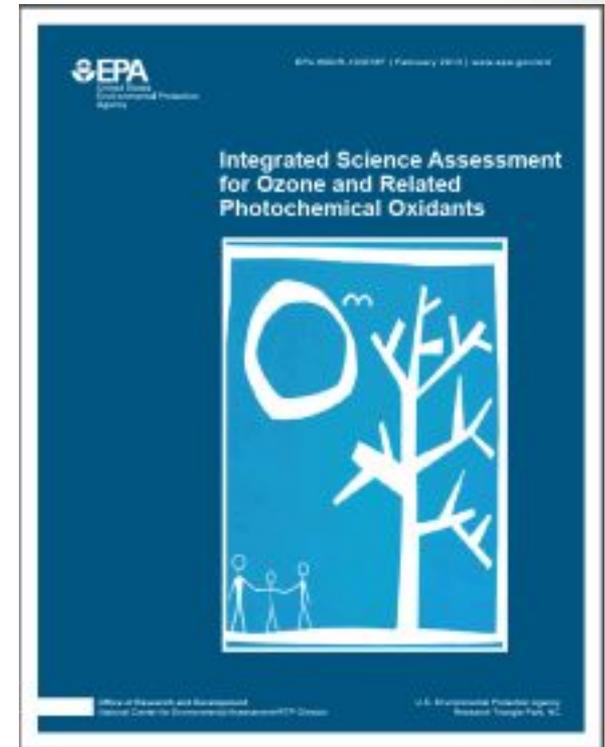
Dose-response for endocrine disruption

- **Some evidence of non-monotonic dose-response for endocrine disrupting chemicals**
- **Concern that low levels in the environment may be more harmful than previously thought**
- **EPA led development of state-of-the-science report**
 - Submitted to NAS in June for peer review
- **Report will help EPA decide if there are adverse effects that current toxicity testing methods do not detect.**



Non-monotonic curve

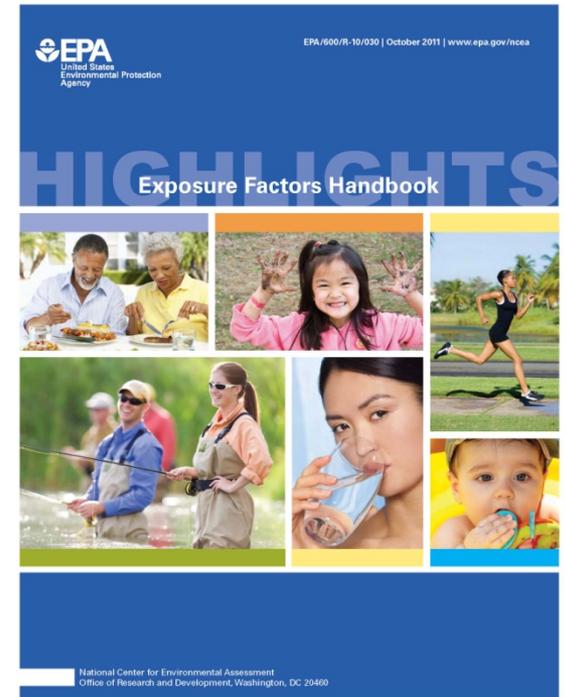
- **Enhancements to the Integrated Risk Information System (IRIS)**
 - Systematic review process across chemicals, with stopping rules
 - Streamlined documents
 - Increased stakeholder engagement and transparency
 - Ongoing NAS review
 - SAB Chemical Assessment Advisory Committee
- **Final Integrated Science Assessments for air pollutants: Lead and Ozone**
- **Collaborating with National Center for Environmental Economics on risk valuation**



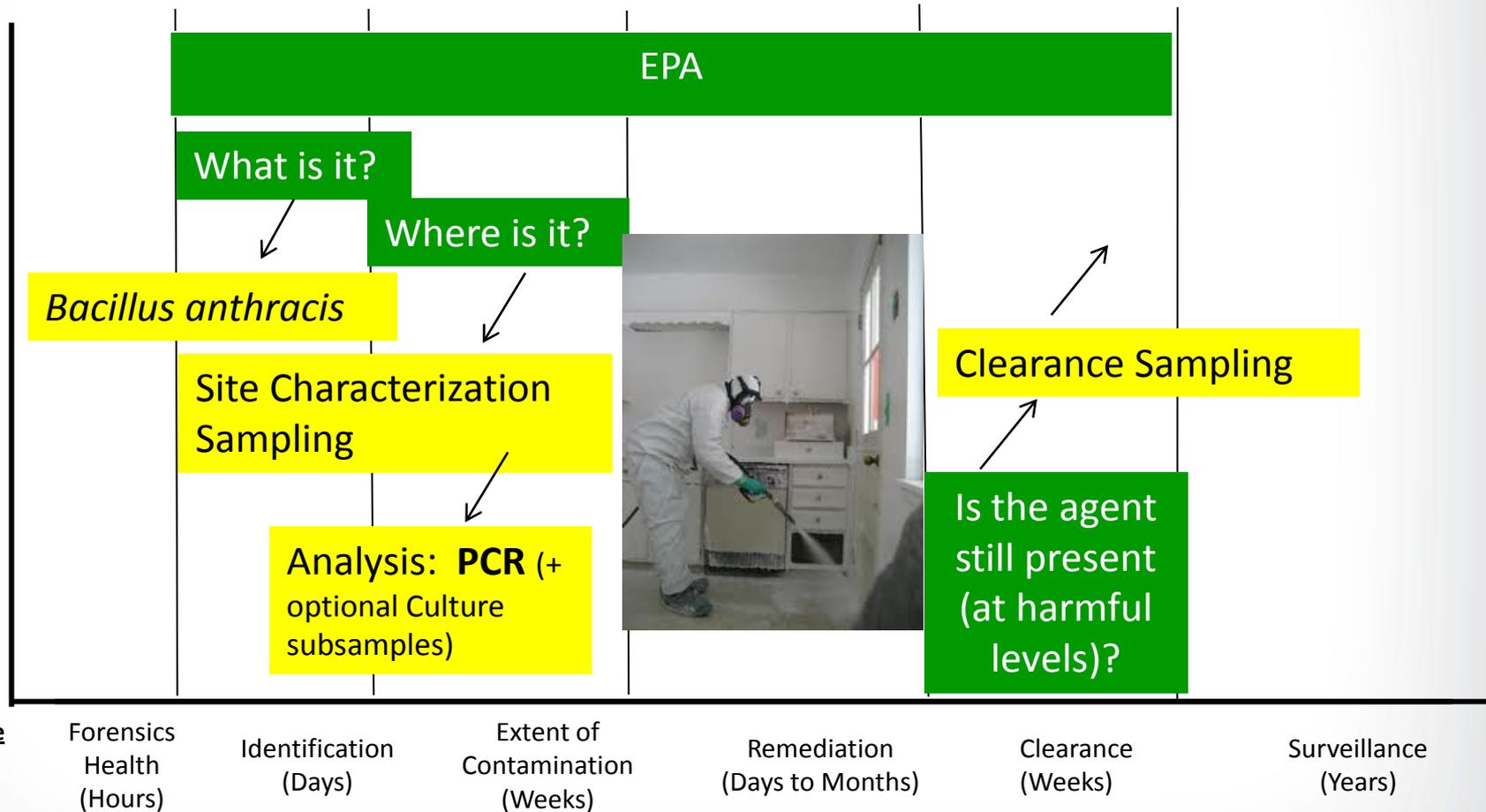


Release of EPA-Expo-Box

- **Comprehensive on-line resource for exposure assessment**
- **Links to guidance documents, databases, models, reference materials, and other resources**
 - New Exposure Factors module to improve accessibility and usability of data from EPA's Exposure Factors Handbook
- **Useful for individuals in government, industry, academia, and the general public**



<http://www.epa.gov/risk/expobox/>



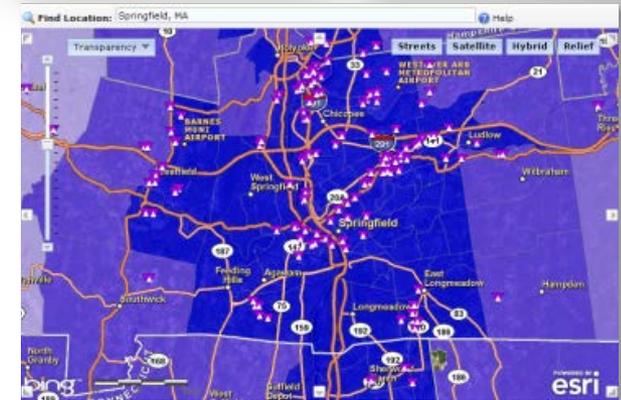
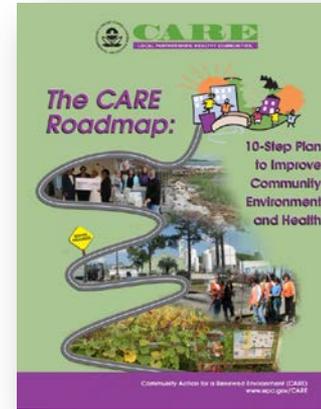


Facilitating Community and Tribal Decision-making

C-FERST: Community-focused exposure and risk screening tool

T-FERST: Tribal-focused environmental risk and sustainability tool

- Web-based “toolkits” providing easier access to information for more than 40 environmental issues
- Mapping local exposures, health risks, and potentially vulnerable sites and populations
- Regions and tribes currently piloting tools
- Ongoing ORD research to populate tools
- Beta version now in use in multiple communities/regions (FY14 public release)



- **Research investments emphasizing sustainability**

- Green infrastructure
- Green chemistry, including
 - NAS alternative chemicals assessment
 - Small business research: mushroom-based replacement for styrofoam
- International effort on reducing pollution from cookstoves



- **Regional Sustainable Environmental Science program**

- Promote sustainable decision-making with communities, and apply ORD tools
- Springfield, MA – evaluating solutions for school indoor air pollution in EJ community
- Proctor Creek, GA – assessing health and environmental impacts of green infrastructure as part of community revitalization efforts

- **Sustainability in coastal communities in Caribbean and Gulf of Mexico**

- Communities struggling with myriad issues: managing development, protecting water quality, sustaining fisheries, boosting tourism and recreation
- EPA and partners provide a structured decision process to help balance social, economic and environmental factors
- Guanica Bay, Puerto Rico: Engaged stakeholders in decision process that led to broad consideration of issues and evaluated alternative policy options.



Sustainability Through NetZero Strategies

Partnerships with military:

- Advancing sustainability, security, and resiliency
- Leverage EPA and DoD resources and expertise
- Include *technology demonstrations, social science study, and economic analyses*
- Exemplify *cross agency, multi-sector collaboration*

Current Projects:

- Water Reuse
- Outreach Study
- Water Decontamination
- Joint solicitation

Contributions from multiple EPA offices, DoE, USACE, USGS, Kansas State University, NGOs and private industry.

Next Step: “Promoting Sustainable Communities through NetZero Strategies.” Workshop February 25 & 26, 2014 in Research Triangle Park, NC



Wastewater treatment at Fort Riley, KS



Social Science & Decision Support Tools

- **Strengthening capabilities in social science**
 - Emphasizing post-docs and other avenues
 - STAR research (upcoming slide)
 - Further collaboration with NCEE
- **Decision support tools**
 - Review of existing tools & data bases (over 400)
 - Coordinate development and link tools together
- **Extend cumulative risk methods to address place-based assessments and community concerns**
 - Include ecological endpoints and other stressors



Progress on Integration

- **Roadmaps for coordination across programs**
 - Climate
 - Nitrogen and co-pollutants
 - Children's Health
 - Environmental Justice
- **Seeking post-docs to help with cross-program issues**
 - Climate – community decision-making (on board)
 - Nitrogen and co-pollutants – economic analysis (announced)
 - Integrating novel data streams into risk assessment (in progress)
 - Communities (in progress)
- **Extend cumulative risk methods to address place-based assessments and community concerns**
 - include ecological endpoints and other stressors



STAR: Solicitation Examples

UPCOMING 2014 RFAs

- **Human and Ecological Health Benefits and Risks Associated with Water Reuse and Conservation Practices**
- **National Center for Sustainable Urban Water Infrastructure Modeling Research**
- **Air, Climate, and Energy (ACE) Research Centers**

NOW OPEN

- **A National Student Design Competition for Sustainability Focusing on People, Prosperity and the Planet**
- **Indoor Air and Climate Change**
- **Organotypic Culture Models for Predictive Toxicology Centers**

2013 RFAs

- **Healthy Schools: Environmental Factors, Children's Health and Performance, and Sustainable Building Practices**
- **New Methods in 21st Century Exposure Science**
- **Science for Sustainable and Healthy Tribes**
- **EPA/NSF Networks for Sustainable Molecular Design and Synthesis**



Looking Ahead

- **President's nominee for the Assistant Administrator for ORD announced, Tom Burke**
- **ORD's Board of Scientific Counselors**
 - Establishing six standing subcommittees
 - To review and advise on operation of research programs
 - Expect new committees to be approved by the Administrator in early 2014



SAB member Tom Burke

2014 Expected Highlights

Safe & Sustainable Water Resources



Air, Climate & Energy



- **First national survey on the condition of the Nation's wetlands**
 - Develop baseline for evaluation of wetland quality, ecosystem services and stressors
- **Innovative technologies for small systems**
 - Performance information and design tools for small drinking water and wastewater systems
- **Report on potential impacts of hydraulic fracturing on drinking water resources**
- **Win-win strategies for air emissions**
 - Science synthesis document on strategies to improve air quality, protect ecosystems, reduce greenhouse gases and other climate forcers



2014 Expected Highlights

Sustainable & Healthy Communities



Human Health Risk Assessment



- **Report on the Environment**
 - New, interactive web platform
 - Added 4 sustainability indicators
- **EnviroAtlas public release**
 - Maps and data on ecosystem services
 - Tool to facilitate sustainable choices in future planning and policy decisions
- **IRIS assessments**
 - Complete at least 2 final assessments using enhanced IRIS process; many others in intermediate steps



2014 Expected Highlights

Chemical Safety for Sustainability



Homeland Security



- **Sensitivity to environmental contaminants**
 - Improved models and methods
 - Species and population level impacts
- **Support for endocrine disruptors screening**
 - Integrating ToxCast and ExpoCast for risk-based prioritization of EDSP chemicals
- **Decontamination**
 - Assessment of methodologies for decontamination of sensitive equipment



Cross-EPA Lab Study

- **Comprehensive evaluation of all of EPA laboratories underway**
 - Review functions across research, program office and regional labs
 - Find options that will increase efficiency and effectiveness
 - Address challenges including: reduced budgets, outmoded laboratories, 21st century scientific needs, reductions in GHG emissions
- **EPA will examine multiple options to**
 - Preserve and enhance science capabilities
 - Understand immediate and longer term financial implications: total cost of ownership, savings and avoided costs, investments needed, and return on investment
- **Laboratory evaluation will conclude in 2014, and will include**
 - Consulting with internal and external stakeholders on potential changes
 - Implementing EPA responses to recommendations from GAO and those of the NRC committee



2014 Strategic Directions Meeting

ORD to develop new strategic plans for 2016-2020

- ORD National Program Directors now thinking about future directions
 - Core programmatic areas
 - New research in FY16 and beyond
- Discussion in 2014 with SAB will be timely

Considerations for structuring the meeting with SAB

- Subgroups to advise our six programs?
- Cross-cutting issues?
 - Climate, Nitrogen & Copollutants, Children's Health





Discussion?

