



Air, Climate, & Energy (ACE)

***Building a Foundation of Science to Support
Policy and Solve Problems***

***Overview for the Board of Scientific Counselors
(ACE Subcommittee)***



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National Program Director

Air, Climate, and Energy Research Program

Office of Research and Development

June 1, 2015

- Background
- Input from Agency Partners and other stakeholders
- Moving the ACE Program Vision into Practice
 - Current Research Structure
 - Recent Highlights
 - Preparing for the Future: Evolving the ACE Portfolio
 - Connections with other National Research Programs, including ORD Roadmaps
- Charge to BOSC – ACE Subcommittee
- Supplemental Information





ORD National Research Programs

Air, Climate & Energy



Sustainable & Healthy Communities



Homeland Security



Chemical Safety for Sustainability



Human Health Risk Assessment



Safe & Sustainable Water Resources





EPA Strategic Plan 2014-2018

Goal 1: Addressing Climate Change and Improving Air Quality

- Conduct integrated science assessments of criteria air pollutants and provide new data and approaches for improving these assessments
- Develop credible models and tools to inform sustainable policies, decisions, and responses to a changing climate by EPA national and regional offices, state, tribal, and local governments, and others
- Conduct research to change the paradigm for air pollution monitoring, with a focus on lower cost measurements
- Develop and evaluate models and decision support tools to integrate multi-media processes and systems
- Develop approaches to assess multi-pollutant exposures and the resulting human and ecological effects of air pollutant mixtures
- Conduct research to inform policies protecting human and ecosystem health in an evolving energy landscape, including impacts of unconventional oil and gas and low-carbon energy sources

http://www2.epa.gov/sites/production/files/2014-09/documents/epa_strategic_plan_fy14-18.pdf



The ACE “Vision”

Problem Statement:

- Protecting health and the environment from the impacts of climate change and air quality in a sustainable manner are central 21st century challenges
 - These challenges are complicated by the interplay of air, the changing climate, and emerging energy options

The ACE Vision

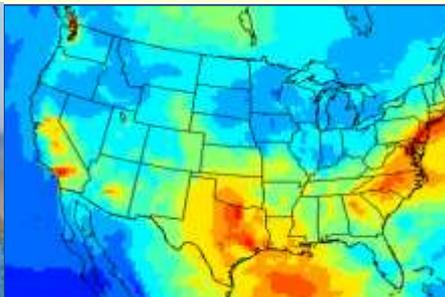
- ORD’s Air, Climate and Energy research program provides cutting-edge scientific information and tools to support EPA’s Strategic goals of protecting and improving air quality and addressing climate change.



The ACE Approach

- Understand the problem and the intended user(s)
 - Develop strong relationships with our Regional and Program Office Partners
 - Ask the right question – typically a community effort
 - Deliver and communicate products and results appropriately translated for the intended user.
- Systems-based science and engineering are the foundation to research planning
 - Apply the best science
 - Innovative thinking breeds innovative outcomes
- Transparency

The Many Dimensions of ACE



EPA

Watershed modeling to assess the sensitivity of streamflow, nutrient and sediment loads to potential climate change and urban development in 20 U.S. watersheds.

A small inset image showing a sunset over a body of water, and another inset showing a river flowing through a landscape.

How does the ACE program develop its research agenda and priorities?



ENVIRONMENTAL Science & Technology

The Changing Paradigm of Air Mitigation

A collage of small inset images related to environmental science and technology.

Healthy Heart

A healthier environment for healthier hearts.

A family of three (two women and a child) smiling and embracing each other.



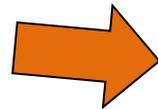
Input from ACE Partners (EPA)

Office of Air and Radiation (OAR)

- Office of Air Quality Planning and Standards
- Office of Transportation and Air Quality
- Office of Atmospheric Programs
- Office of Indoor Air and Radiation

Office of Enforcement and Compliance Assurance (OECA)

Office of Water (OW)



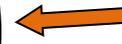
Office of Solid Waste and Emergency Response (OSWER)



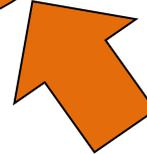
- Office of International and Tribal Affairs
- Office of Children's Health Protection
- Office of Policy (National Center for Environmental Economics)
- Environmental Justice



Office of Chemical Safety and Pollution Prevention (OCSP)



EPA Regional Offices (R1-R10)





Communication and Coordination with EPA Partners

Advanced regular communications with RO/POs

(Fluid and Continual Communication)

- Biweekly “ACE Connections” calls and monthly Climate calls with ORD, Region, and Program Office staff
- Periodic visits to Regional and DC Program Offices
- Monthly to quarterly dialogues with RO and PO managers and AAs
- Active Website interface; recent updates to internal and external webpages (<http://www2.epa.gov/air-research>; <http://www2.epa.gov/climate-research>)
- Web-based quarterly newsletter – “ACE Research News”
- Monthly ACE / Clean Air Centers Webinars
- Product manuscripts, reports, synthesis documents, project webinars, etc. [Detailed in the ACE Communication Plan]
- Annual Program Overview – *The ACE Jamboree*





Input from Outside Stakeholders

Other Federal Agencies

- NIH: NIEHS, NHLBI
- Federal Highway Administration
- Centers for Disease Control
- Council on the Environment and Natural Resources and Sustainability (CENRS) – multiagency workgroup

State and Local Agencies

- National Assoc. of Clean Air Agencies (NACAA)
- Assoc. of Air Pollution Control Agencies (AAPCA)
- Environmental Council of States (ECOS)

Industry (e.g., EPRI)

- Community action groups (R2: Ironbound)
- Community coordination (e.g., Las Vegas, Detroit near-road)
- Tribal coalitions (visiting speakers)

- U.S. Global Change Research program (USGCRP)
- Intergovernmental Panel on Climate Change (IPCC)
- Global Alliance on Clean Cookstoves (GACC)

Agency Advisory Groups

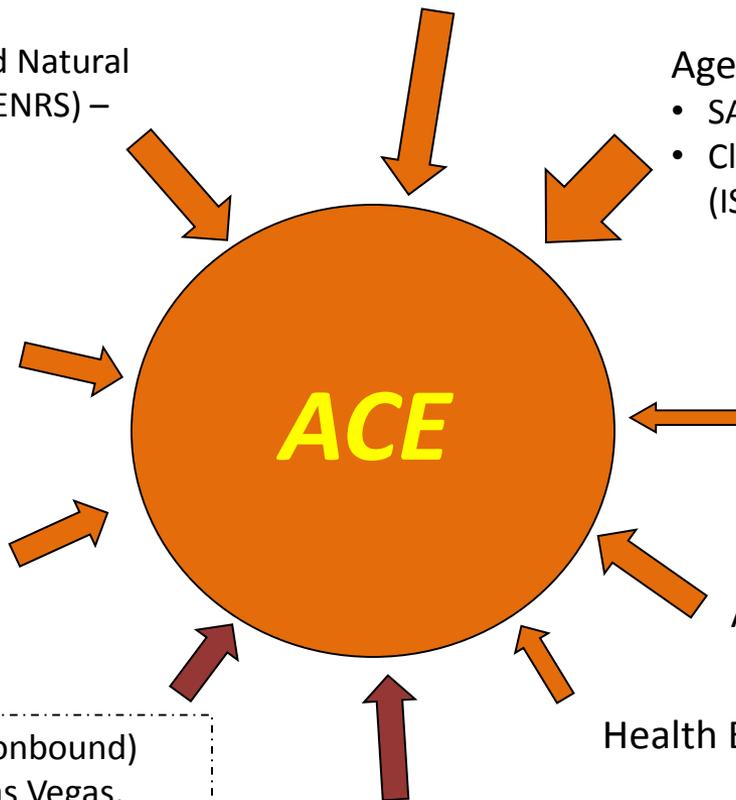
- SAB, BOSC
- Clean Air Science Advisory Committee (ISA review process)

Science Associations (e.g., ATS, SOT, AWMA - annual meetings, workshops)

Academia

Health Effects Institute (HEI)

International links – EC, WHO



Multiple pathways for communication



EPA Partner-Stakeholder Priorities



- **Implementation Sciences** - new measurement technologies (e.g., sensors); air quality models/tools
- **Emissions Science** - oil & gas priority; updating multiple inventories (e.g., CAFO's)
- **Public Health/Welfare** - multipollutant issues (e.g., NO_x/SO_x, near-roadway risks, exposure science)
- **Climate Change Preparedness** – assessments and adaptation are important (e.g., cross-media models), mitigation



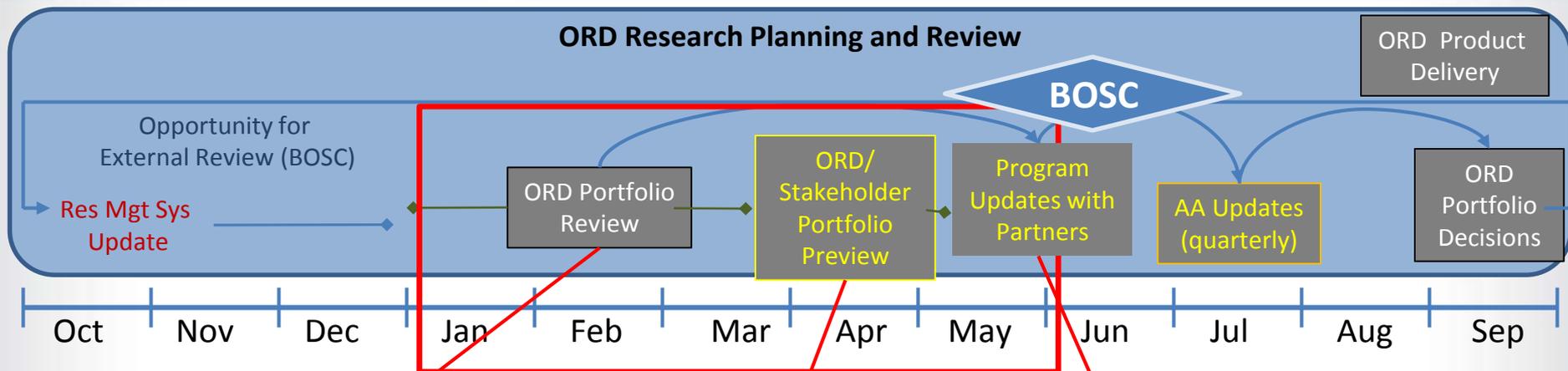


Overarching ACE Research Priorities

- Multipollutant nature of air pollution needs to be addressed
- Incorporation of new technology into monitoring networks
- Preparedness for climate change and the development of sustainable adaptation and mitigation options
- Human and environmental health impacts of current and future energy alternatives
- Tools and models are needed to address environmental problems that range from global to local scales
- Social, behavioral and economic factors that influence the effectiveness of air quality and climate policies
- Translating what we have learned for *real-world* utility



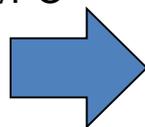
Planning Calendar: ACE Portfolio Review and Opportunities for RO/PO Stakeholder Input



ORD Review (Jan-Mar)

– **Outcomes**

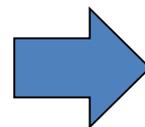
- Review status of products/outputs
- Proposed direction of research – Topic discussions
- Factor in earlier input from RO/PO
- Review projects and tasks
 - Identify ending tasks
 - New Task ideas
 - Identify projected resource needs
 - Focused review of specific topics portfolio



RO/PO Review (Apr-May)

– **Outcomes**

- Obtain feedback from RO/PO on results of ORD review
- Review potential realignment of projects
- Consider possible adjustment in tasks



ACE Jamboree IV (May 27-28)

- Status of products including highlights/issues
- Changes in research directions
- RO/PO feedback on previously delivered products
- RO/PO input on progress
- New/emerging RO/PO needs
- Presentation of new task ideas

← Regular Meetings/Updates (see Communication/Coordination Table in Supplemental Information) →

New idea development Concept review

Proposal write-up



2015 ACE Planning - Coordination with EPA Partners

Planning 2015-17 - Increased emphasis on transparency in the planning and review process of the Program

- Regional and Program Office (RO/PO) Partner consultation fed...
 - Preliminary draft *ACE Strategic Research Action Plan* (StRAP) – June 2014
 - Feedback and revision of the draft StRAP – May 2015
 - Currently: Draft Project Charters (Spring 2015) being revised over the summer
- Multiple meetings / webinars with RO/PO Partners
 - 2014 ACE highlights – October (2014)
 - Formal annual research needs provided by Regions [organized by Lead Air Region]; Office of Air and Radiation; Office of Water (mostly climate); Office of Enforcement and Compliance Assurance (sensors) and partner offices (e.g., via cross program discussions)
 - Early thinking on potential revisions to ACE Topic Areas and Projects
 - Part 1: Framework (Mar 4)
 - Part 2: Summary of internal ORD in-depth reviews (April 9)
 - ACE Jamboree IV – annual program update (May 27-28)
 - Planning five additional detailed Topic Area webinar-discussions Jun-Jul
 - **Final StRAP and Program Structure launch – Oct 2015**

* See also: *Research Planning Calendar* in Supplemental Information

Moving the ACE Program Vision into Practice: Current Research Structure



- See also *ACE Research Program Resources for FY12-15* in Supplemental Information



ACE Research Objectives

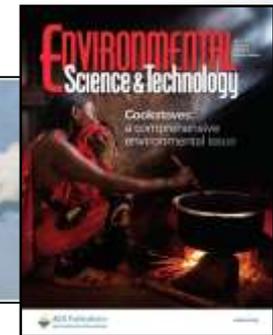
Objective 1: Assess Impacts

Assess human and ecosystem exposures and effects associated with air pollutants and climate change at individual, community, regional, and global scales



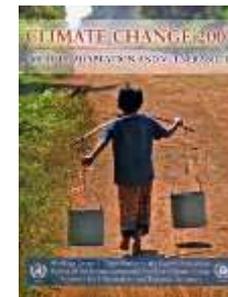
Objective 2: Prevent and Reduce Emissions

Provide data & tools to develop and evaluate approaches to prevent and reduce emissions of pollutants to the atmosphere, particularly environmentally sustainable, cost effective, and innovative multipollutant and sector-based approaches



Objective 3: Prepare for and Respond to Changes in Climate & Air Quality

Provide human exposure and environmental modeling, monitoring, metrics and information needed by individuals, communities, and governmental agencies to adapt to the impacts of climate change and make informed public health decisions regarding air quality



ACE Themes

Theme 1:
Assess Impacts

Theme 2:
Prevent / Reduce
Emissions

Theme 3:
Prepare for
Changes



ACE Research Topics

Current 2011-2015

Climate Impacts
Mitigation and
Adaptation (MA)

Emissions and
Measurements (EM)

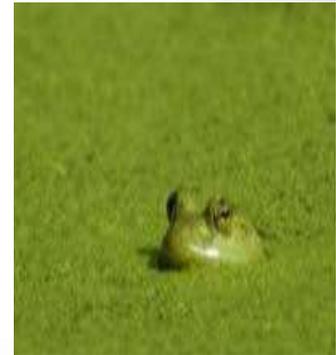
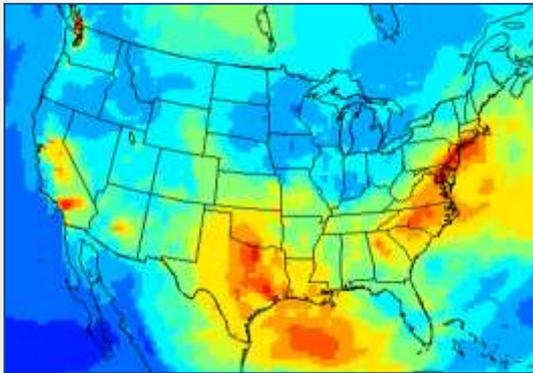
Modeling and
Decision Support
Tools (MDST)

NAAQS and
Multipollutant
(NMP)

Sustainable Energy
Evaluation (SEE)

ACE Topic	Near-Term Targeted Research Aim	Long-Term Mission Driven Research Aim
Climate Impacts, Mitigation, and Adaptation (CIMA)	Address climate change impacts on air and water quality, and human / ecosystem health	Develop sustainable climate adaptation and mitigation approaches
Emissions and Measurements (EM)	Develop and evaluate regulatory methods for source and ambient air monitoring	Change the paradigm for air pollution monitoring
Modeling & Decision Support Tools (MDST)	Develop and evaluate local, regional, and hemispheric air quality modeling tools	Develop and evaluate models to integrate multimedia processes and systems
NAAQS and Multipollutant (NMP)	Inform NAAQS Reviews	Develop approaches to interpret multipollutant exposures and the resulting human and ecological effects of air pollutant mixtures
Sustainable Energy Evaluation (SEE)	Evaluate environmental impacts of energy technology	Inform policies protecting human and ecosystem health in an evolving energy landscape

A few HIGHLIGHTS from the past year...

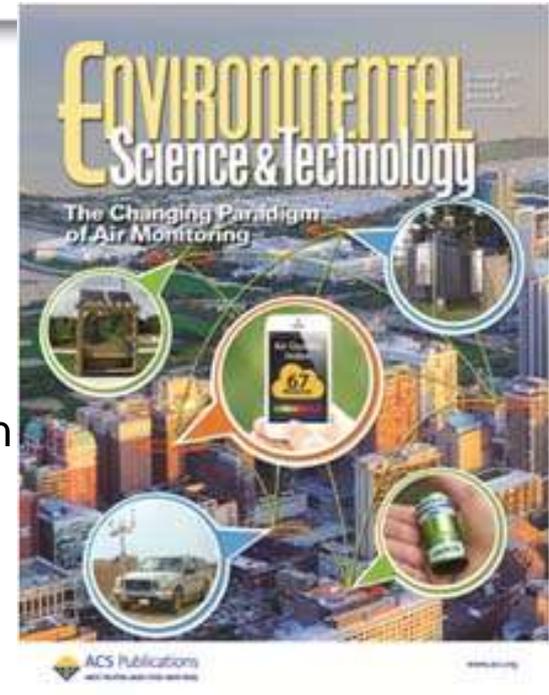


* See also ACE Jamboree IV materials.

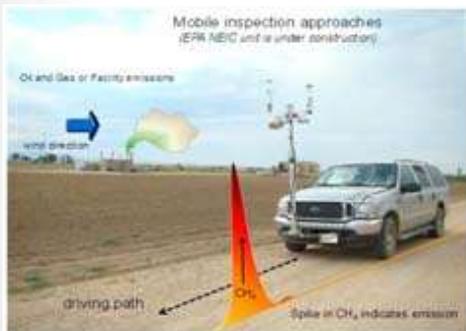


Next Generation Air Monitoring

- New technology revolutionizing regional, community, fence-line, personal monitoring
- EPA is the national lead – 1st 3 Google listings
- EPA's Air Sensor Toolbox on the web
- ORD has developed a prototype testing platform
- Promoting community science, outreach and education
- Working with NOAA, NASA, NSF to relate satellite-based air quality data



Featured article on sensors



Mobile monitoring for geospatial mapping of pollutants (GMAP)



“Village Green” park bench monitors air quality (7 sites by end of 2015)



Jointly funded Innovation Project with NIEHS



The Village Green: Expansion

VG air monitoring station:

Measures PM_{2.5}, ozone, wind, temperature and humidity every 1 minute

Remaining sites:

- Oklahoma City, OK
- Hartford, CT

System was installed this spring on 6th-12th grade school rooftop in Hong Kong

Goal of the study is to evaluate measurement system performance; data hosted by local university

School located in densely populated area, surrounded by residential high rise buildings

Kansas City, KS



Washington DC



Philadelphia, PA



Field-testing in North Carolina



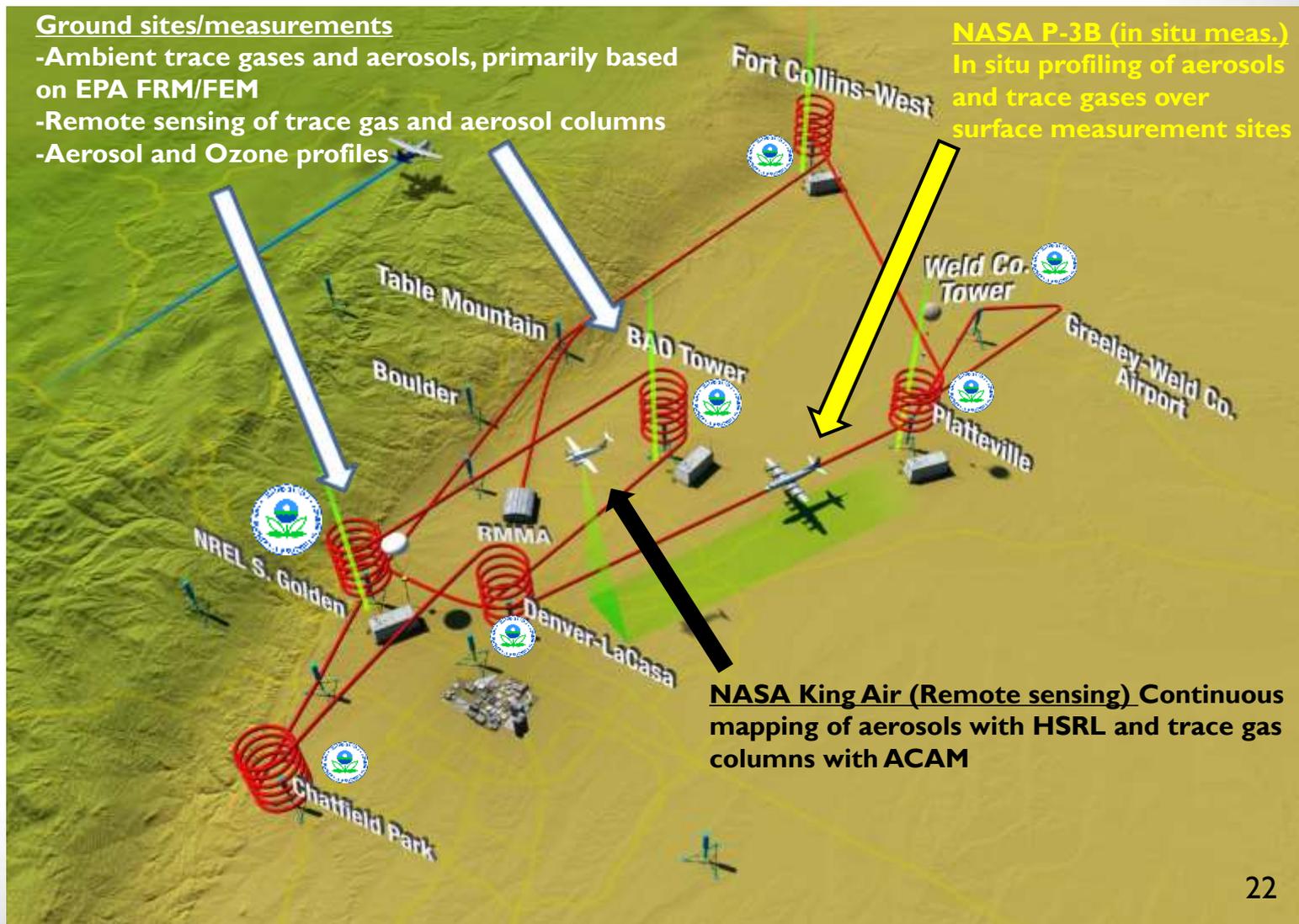


DISCOVER AQ - Denver, CO July-August 2014

3rd Field Campaign with NASA to develop / optimize measurement technologies

Systematic intercomparison:

- Satellite
- Aircraft
- Ground (FRM and sensors)
- Linked to community science participation





Emissions Inventory Workgroup

Goals

- Improve estimates and characterization of emissions
- Increase transparency, compatibility, and comparability of inventories
- Improve EPA processes and connections to optimize our foundational information and our coordination



Cross EPA Workgroup

- ORD – NRMRL & NERL
 - Measurement and Models
- OAQPS – AQAD & SPPD
 - NEI, Emission Factors, and Regs
- OAP – CCD
 - Greenhouse Gas Inventory and Reporting Programs
- Regions 6 & 8
 - SIPs, Permitting, NEPA, etc.
- OAR/OPAR – Global Inventories
- OECA (contributing) – Enforcement

Mobile Smog Simulator

- Generate synthetic atmospheres of multiple air pollutants mimicking different U.S. regions
- Precise temperature and humidity control – simulate changing climate conditions (unique capability)
- Controlled exposures using animal models and in-vitro assays to evaluate effects
- Initial studies show respiratory effects and cardiac arrhythmias in rodents exposed to multipollutant mixtures



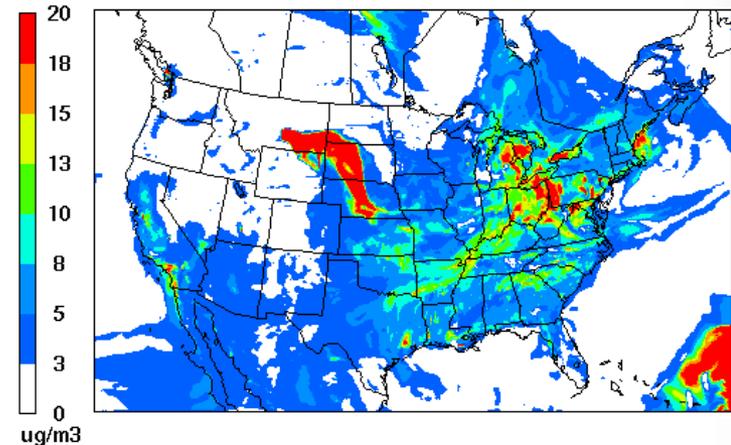
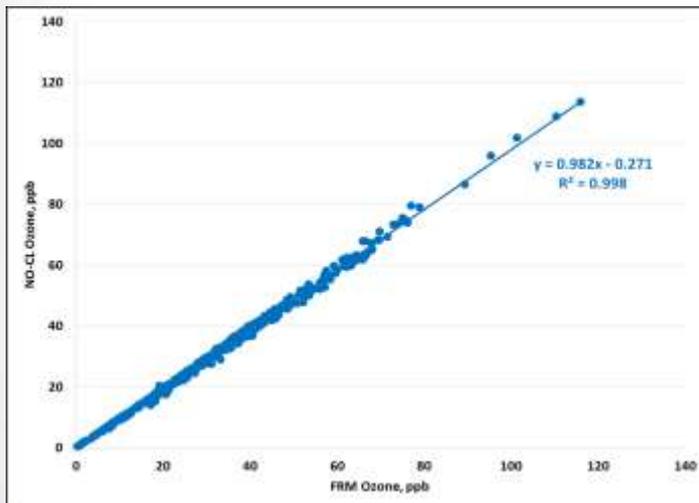
Impacts of Wildfires on Public Health

- Wildfire smoke produced higher rates of respiratory effects and congestive heart failure in those exposed
- Socioeconomic status influenced the distribution of risk across disparate communities:
 - Lower SES factors (education, employment, income) and access to quality health care were associated with worse health outcomes
- NOAA's smoke forecasts were predictive of health outcomes and can be used to forecast potential exposures
 - Public health interventions based on these smoke forecasts can reduce mortality and morbidity with significant economic benefits

Pocosin, NC Bog Fire - 2008



- Enabling development and evaluation of regulatory monitoring methods
- Excellent agreement between current FRM and new FRM for O₃
- EPA will retain current FRM and add new NO-CL FRM



State-of-science Community Multi-scale Air Quality (CMAQ) model - Release 9/2015

- Improved ultrafine PM estimates
- More accurate predictions of the effects of N emissions
- Better multipollutant predictions
- Improved biogenics for VOCs
- Better prediction of urban heat island effects
- Improved fine-scale simulations (1-4 km)
- Better representation of aerosols on climate



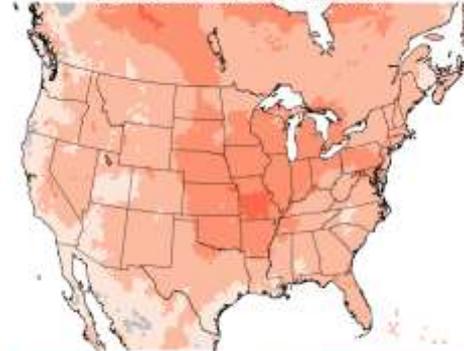
Improved Methods for Down-Scaled Climate Model Results

- Dynamic downscaling of global climate model - improves representation of key influences on air pollution formation and transport (including atmospheric circulation, summertime precipitation, effects on lakes, and extreme events)
- Downscaled data improved resolution and the role of important meteorological parameters
- Results - areas of increased daily maximum 8-h average ozone largely consistent with areas of increased daily maximum temperature

ModelE2 (RCP 6.0)

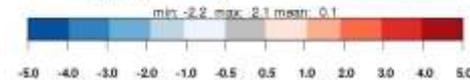
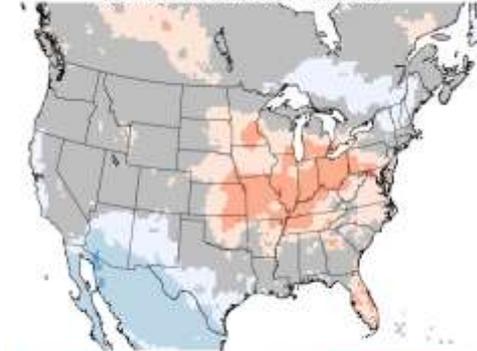
Daily Max Temp

Change in May-Sep Average Daily Max Temperature (F)
GISS RCP6.0 2025-2035 - 1995-2005



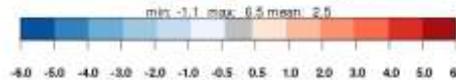
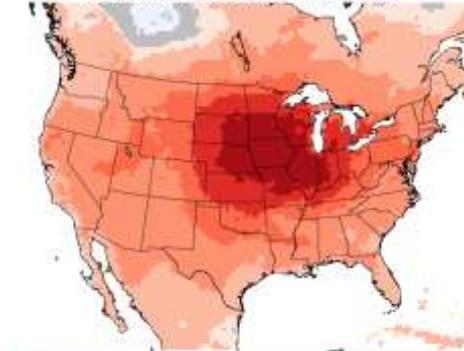
Daily Max 8-h O₃

Change in May-Sep MDA8 O₃ (ppb)
GISS RCP6.0 2025-2035 - 1995-2005

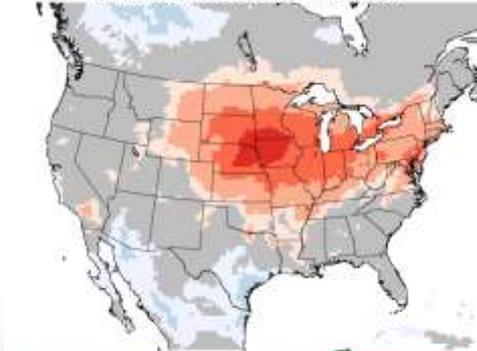


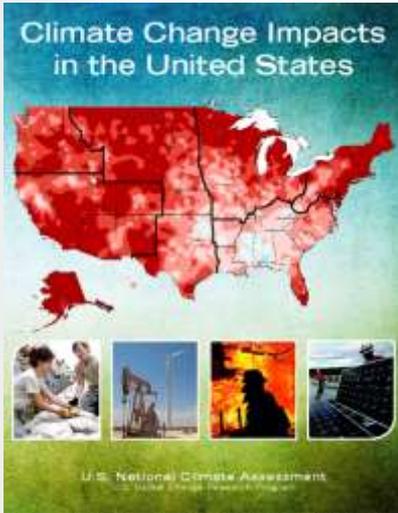
CESM (RCP 8.5)

Change in May-Sep Average Daily Max Temperature (F)
CESM RCP8.5 2025-2035 - 1995-2005



Change in May-Sep MDA8 O₃ (ppb)
CESM RCP8.5 2025-2035 - 1995-2005

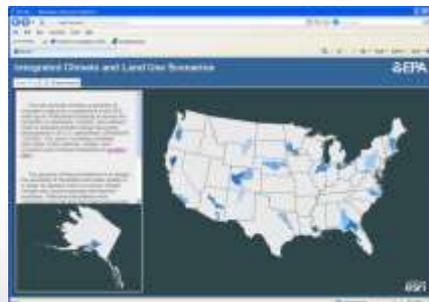
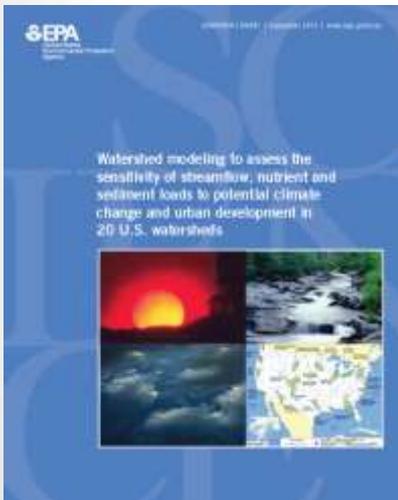




- The **2014 National Climate Assessment** update provides an improved understanding of climate change impacts on the environment and human health and well-being
 - Substantial scientific input and strategic guidance provided from across EPA HQ and Regional Offices
 - ACE staff also coordinated EPA scientific review efforts

The 20 Watersheds Report

- Assess sensitivity of U.S. streamflow, and water quality to mid-21st century climate change and urban development scenarios



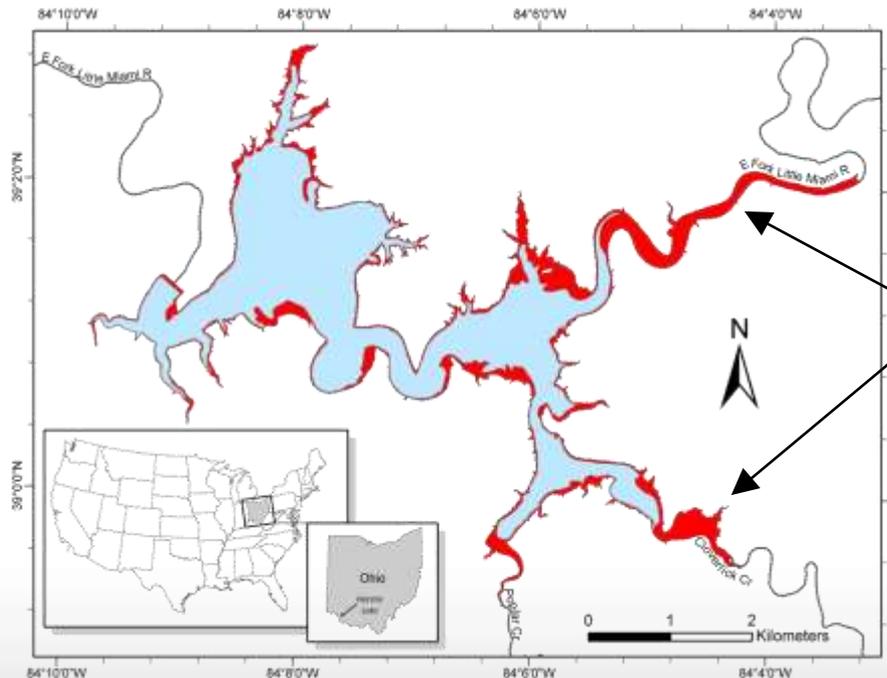
- Evaluate implications of different methodological choices and scenarios for assessing impacts



Methane Emissions from a Mid-Latitude Agricultural Lake

Ancillary Product: Studies related to understanding nutrients and impacts in water bodies led to the discovery of higher-than-expected methane emissions from mid-latitude lakes. The results could have important implications for methane emission inventories.

The extreme upstream portions of the reservoir supported CH_4 emission rates one to three orders of magnitude greater than other portions of the system, highlighting the importance of including river deltas in reservoir CH_4 budgets.

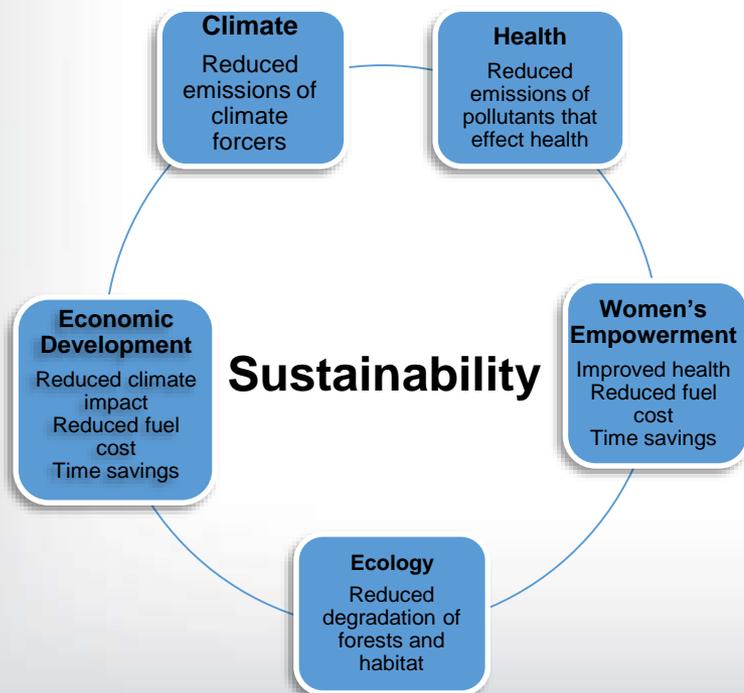


Managing CH_4 hotspots

'Transition zones' are CH_4 hotspots.

Can emissions be mitigated through water level management?

- Support ISO Technical Committee – Clean Cookstoves and Clean Cooking Solutions
- Results of round-robin testing in support of *Global Alliance for Clean Cookstoves* – Regional Testing and Knowledge Centers
- Air pollutant emissions and fuel efficiency for ten stove/fuel combinations

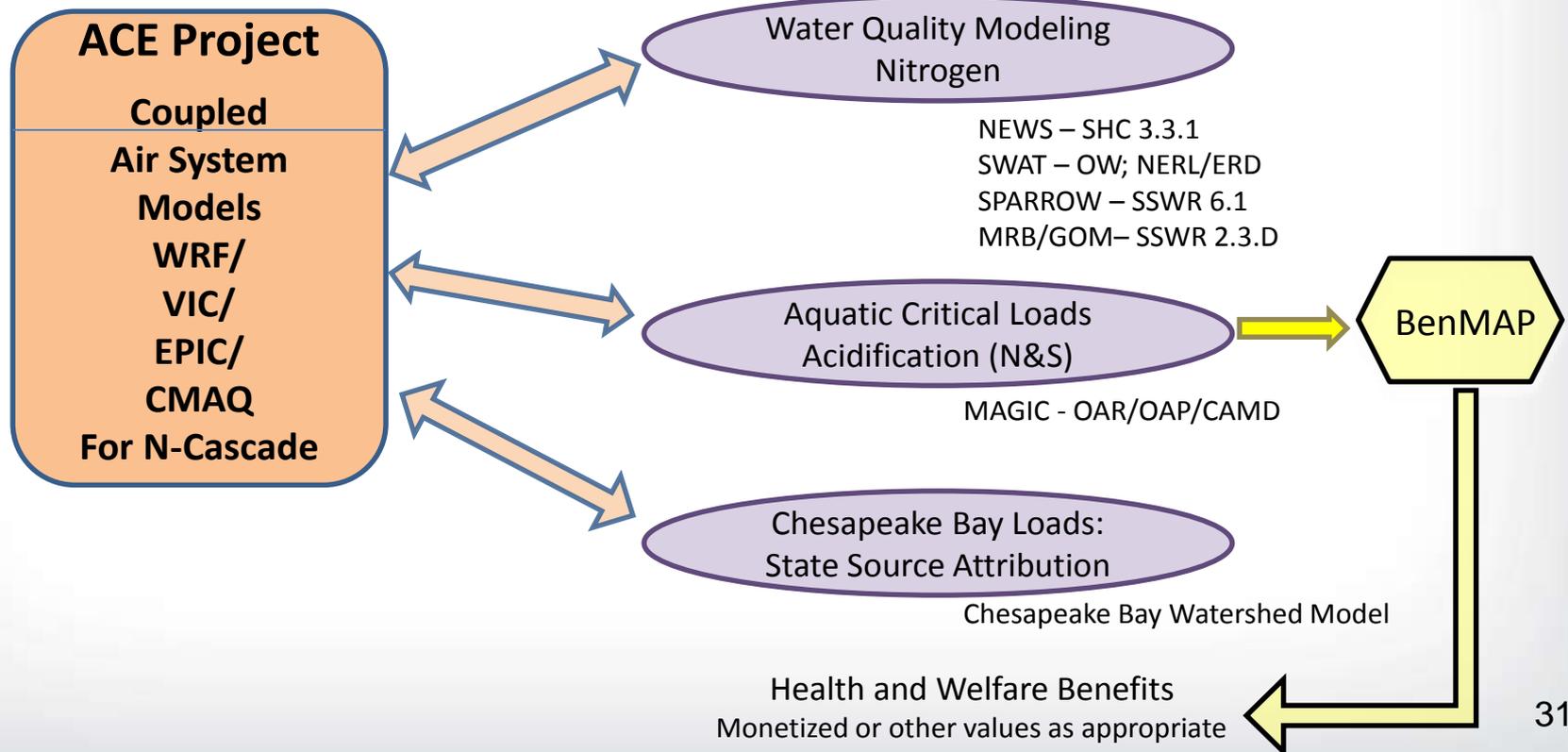


- Journal articles on mutagenicity and PAH emissions and results of tests for three solar cookers
- Whole smoke condensate collection system to collect volatile and semi-volatile precursors of PM for animal and in-vitro studies
- Third annual workshop on best practices for Regional Testing and Knowledge Centers
- \$8M STAR research investment

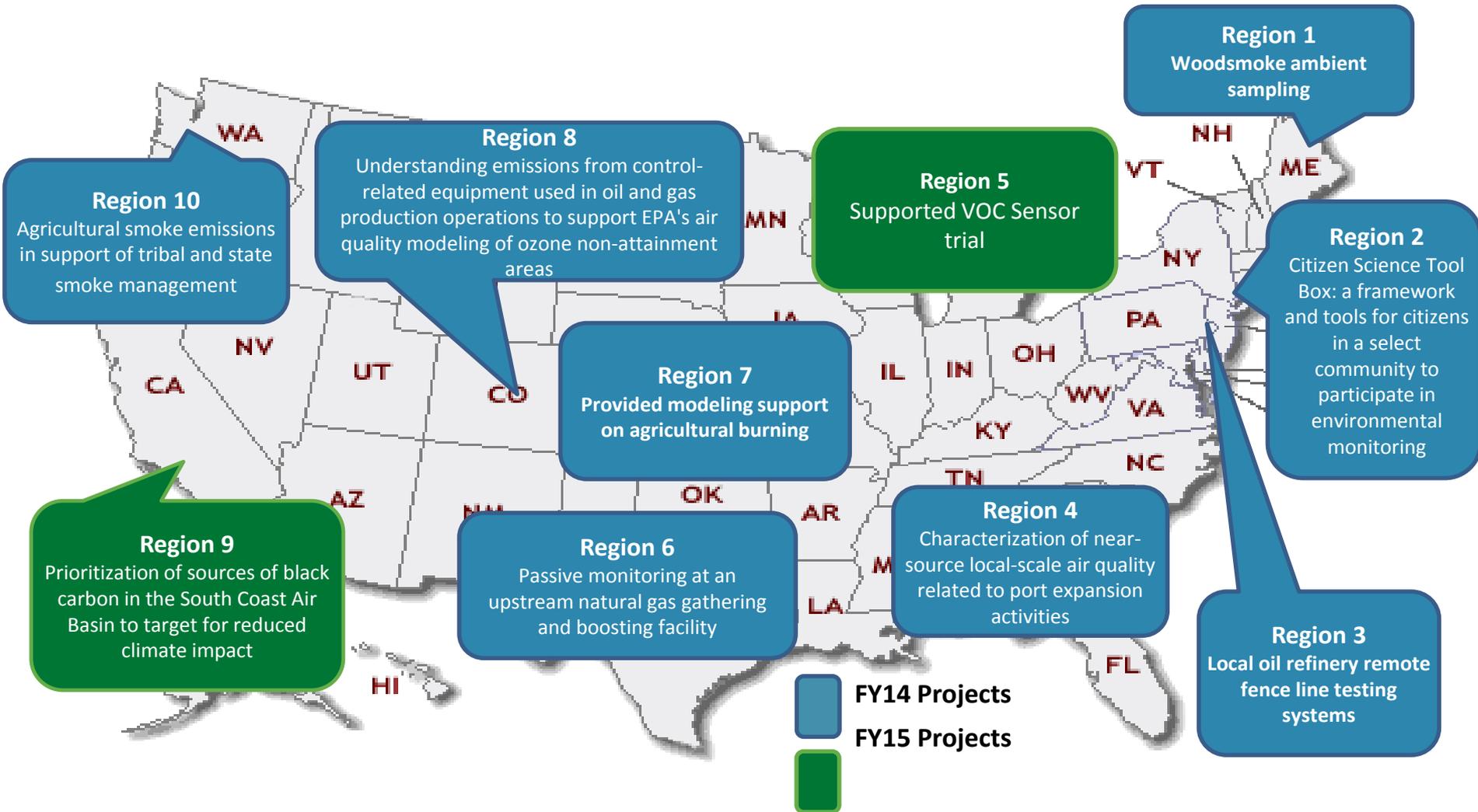


One Environment Modeling

- Developing state-of-the-science atmospheric deposition modeling system with linkage to ecosystem models
- FY14 Product – “Prototype air-water environmental system with linkage between meteorology/ hydrology/ air quality model system and watershed acidification model (MAGIC)”



ACE Regional Research



Region 2 RARE project with Ironbound Community

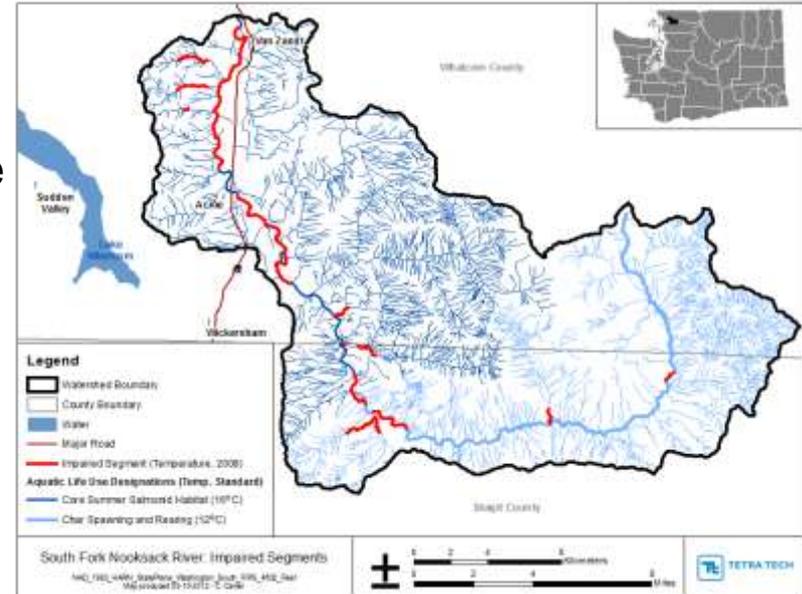


Research to Support Region 10 TMDLs: Climate Change Impacts



Key objectives:

- Assess potential impacts of climate change on stream temperature and stream flow in the South Fork Nooksack River watershed
- Prioritize stream restoration actions considering climate change
- Apply knowledge to guide implementation of EPA's National Water Program 2012 Strategy: Response to Climate Change



Desired outcome: Address climate change in TMDL guidelines to protect salmon habitat and support recovery goals of ESA Salmon Recovery Plan

Collaborative effort involving Region 10, OW, Nooksack Indian Tribe, State of Washington, USFS, NOAA Fisheries and USGS

Preparing for the Future: Evolving the ACE Portfolio





Re-Visioning ACE

We are currently taking a fresh look at the ACE Program and how it is positioned to meet EPA's science challenges over the next 5-10 years

- Improve our alignment with the highest Agency priorities, including:
 - Climate change – nothing will be unaffected
 - Improving air quality
 - Rapid development in air sensor and computing technologies
 - Growing public interest in environmental information for community self-empowerment
- Focus on research that can be translated into practice and solutions
- Consider effective options to move forward; being responsive, timely, and flexible – with anticipation of new challenges
- Enhance integration across projects, Labs/Ctrs, and 6 Nat'l Res Programs
- Infuse systems thinking and sustainability as foundational principles
- Emphasize improved communication
 - Enhanced product delivery – translation
 - Recruit partner input and feedback through better partnerships
 - Expanded outreach/education
 - Marketing who we are and what we do



Restructuring Research Topics

ACE Research Topics

ACE Themes

Theme 1:
Assess Impacts

Theme 2:
Prevent / Reduce
Emissions

Theme 3:
Prepare for
Changes

Current 2011-2015

Climate Impacts
Mitigation and
Adaptation (MA)

Emissions and
Measurements (EM)

Modeling and
Decision Support
Tools (MDST)

NAAQS and
Multipollutant
(NMP)

Sustainable Energy
Evaluation (SEE)

Proposed 2016-2020

Climate Impacts,
Vulnerability, and
Adaptation (CIVA)

Emissions and
Measurements (EM)

Atmospheric and
Integrated Modeling
Systems (AIMS)

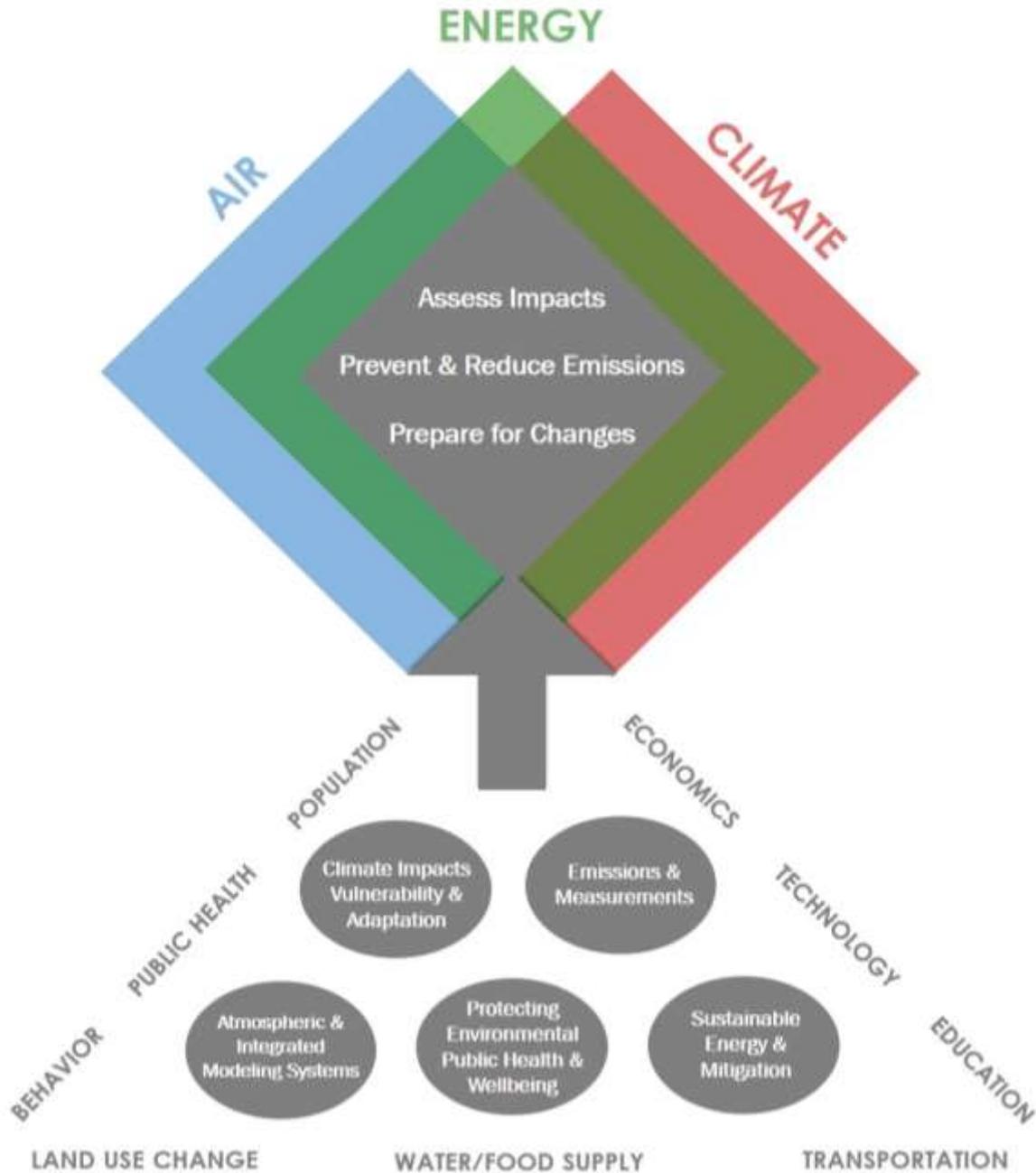
Protecting
Environmental
Public Health and
Wellbeing (PEP)

Sustainable Energy
and Mitigation (SEM)



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FY16-19 Strategic RAP Themes

Climate Impacts Vulnerability and Adaptation

Assess the impacts of climate change on the environment and public health to inform the development of sustainable approaches to prepare for climate change

Emissions and Measurements

Develop innovative technologies and approaches to characterize source emissions and ambient air pollutants

Atmospheric and Integrated Modeling Systems

Develop and apply air quality and cross-media models to support regulatory and community-based decisions

Protecting Environmental Public Health and Wellbeing

Develop solutions-oriented approaches to assess multipollutant exposures and resulting human and ecological effects of air pollutant mixtures to inform policy and public health practices

Sustainable Energy and Mitigation

Assess the environmental impacts and those factors affecting energy sectors choices from extraction to end-use



Proposed Program Structure

Topic	Project
Climate Impacts, Vulnerability and Adaptation (CIVA)	CIVA-1: Climate Impacts on Human Health, Air Quality and Ecosystems
	CIVA-2: Climate Impacts on Watersheds, Water Quality and Ecosystems
	CIVA-3: Systems-based Approaches for Sustainable Solutions
Emissions and Measurements (EM)	EM-1: Emissions and Measurements for Informing Policy Decisions
	EM-2: Improving Emissions Inventories Using Measurements and Models
	EM-3: Changing the Paradigm for Air Pollution Monitoring
Atmospheric and Integrated Modeling Systems (AIMS)	AIMS-1: Multiscale, Multipollutant Air Quality Modeling
	AIMS-2: Integrated Multimedia, Multi-stressor Systems Model Development
Protecting Environmental Public Health and Wellbeing (PEP)	PEP-1: Local and Regional Characteristics Influencing Public Health Impacts in Healthy and At-Risk Populations
	PEP-2: Modifiable Factors that Influence Air Pollution-related Public Health Impacts in Healthy and At-Risk Populations and Mitigation Strategies to Reduce Exposure
	PEP-3: Air Pollution and its Impacts on Ecosystems and Wellbeing
	PEP-4: Translate Research into Actions that Protect Public Health and Wellbeing
Sustainable Energy and Mitigation (SEM)	SEM-1: Systems, Scenarios and Life Cycles
	SEM-2: Energy Extraction, Production, and Delivery
	SEM-3: End-Use Impacts



***Much more detail in the
Jamboree IV book***



Connections with Other ORD Research Programs

Air, Climate & Energy



**Sustainable & Healthy
Communities**



Homeland Security



**Chemical Safety for
Sustainability**



**Human Health Risk
Assessment**



**Safe & Sustainable
Water Resources**





Opportunities to Integrate & Leverage Research with ORD's Other Five National Research Programs (1)

- **Sustainable and Healthy Communities (SHC)**

- Providing information to better understand public health impacts of air pollution and climate change at the community level
- Enhancing knowledge of potential at-risk populations and lifestyles, especially asthmatics
- Supporting next generation air monitoring techniques, including air sensor-related citizen science
- Expanding our understanding of ecological impacts of atmospheric deposition of nitrogen and co-pollutants
- Developing and applying air quality modeling tools



- **Safe & Sustainable Water Resources (SSWR)**

- Enhancing our understanding of the nitrogen life-cycle assessment
- Exploring climate change impacts on demand of water for energy production
- Evaluating the impacts of climate change on aquatic ecosystems
- Projecting possible future climate change impacts on watersheds





Opportunities to Integrate & Leverage Research with ORD's Other Five National Research Programs (2)

- **Human Health Risk Assessment (HHRA)**
 - Informing Integrated Science Assessments (ISAs) and Integrated Risk Information System (IRIS) assessments
 - Advancing cumulative risk assessment (CRA) methods to evaluate multipathway/ multipollutant exposures and associated health and welfare effects
- **Chemical Safety for Sustainability (CSS)**
 - Supporting development of high-throughput approaches to evaluate the toxicity of individual air pollutants as well as air pollutant mixtures
- **Homeland Security (HS)**
 - Promoting community resiliency to the impacts of extreme events related to climate change



- **Four Research Roadmaps at different stages of development**
 - Nitrogen and Co-Pollutants
 - Children's Environmental Health
 - Global Climate Change
 - Environmental Justice
- **Distinct from StRAPS**
 - Show how research is integrated currently across 6 Nat'l Res Progs
 - Identify potential research gaps and catalyze interactions





How the BOSC can help ACE

(in the view of Costa)

- Develop a working knowledge of ACE over the next few years
 - An advisory and constructively critical relationship
 - Assess what we've done (60%) and view to the future (40%)
- Provide an objective perspective of ACE's "state of affairs"
 - Program design
 - Program and science management
 - Program progress
 - Quality of ACE science
- What information can we provide to help you in this task?
 - Annual updates or other?
 - Role/value of Program and Regional Office input?
 - Find a balance of transactional costs for all of us yet achieve our objective



BOSC Charge Questions: Purpose and Design

- CQ-1. Given the research objectives articulated in the StRAP, are the topics and project areas planned and organized appropriately to make good progress on these objectives in the 2016-2019 time frame?

- CQ-2. How effective are the approaches for involving the EPA partners in the problem formulation stage of research planning?

- CQ-3. How well does the program respond to the needs of EPA partners (program office and regional)?



BOSC Charge Questions: Program Effectiveness and Quality

- CQ-4. Please comment on the quality of the products delivered by the program. Are there additional approaches that could be taken by the program to ensure that its products are of high quality?

- CQ-5. How well have we translated research findings and understanding for the end-users? How can we improve our ability to translate research findings and understanding for end-users in the future?



Supplemental Information



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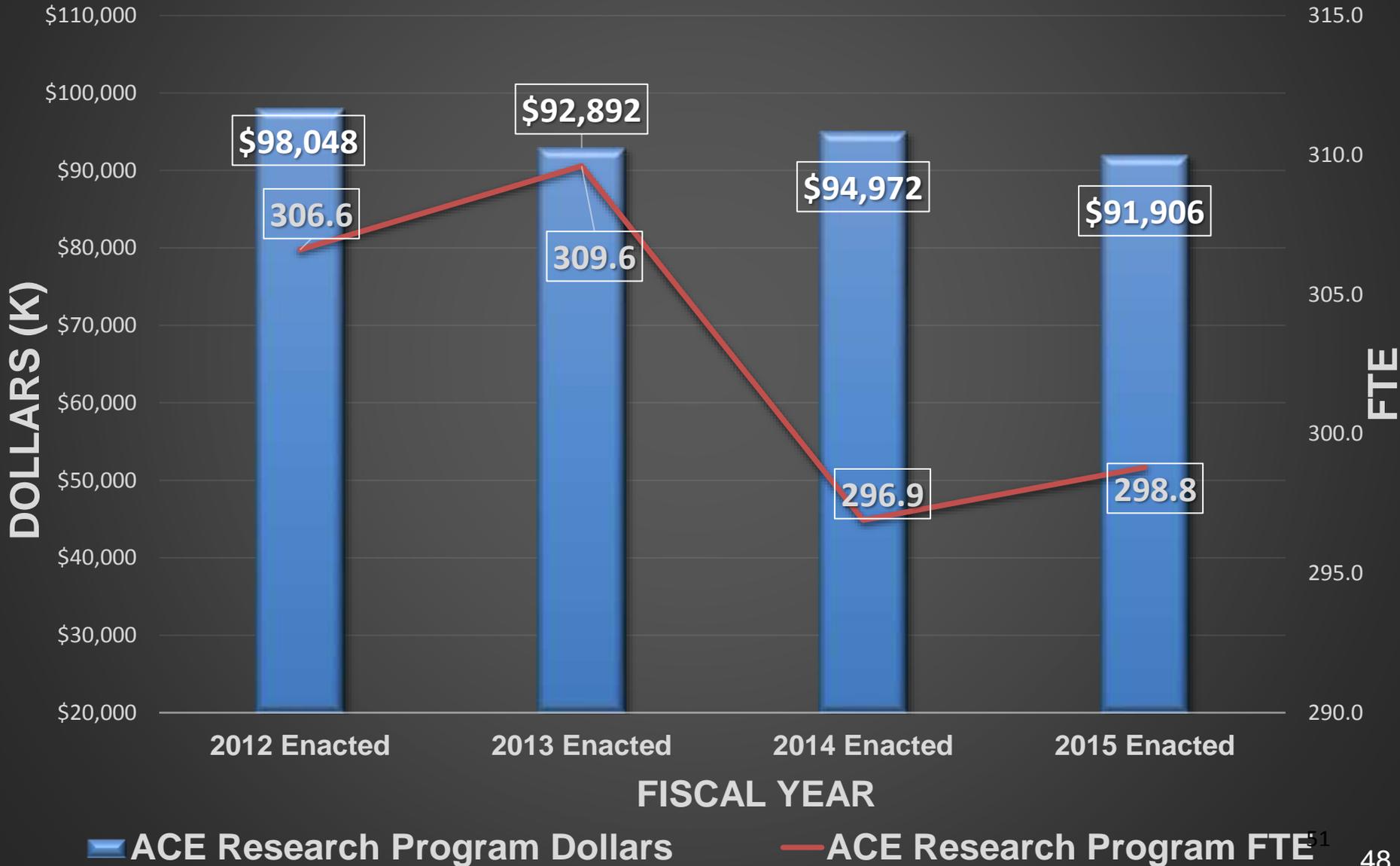
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ORD – Air, Climate and Energy Research Program Resources

FY12 – FY15 Dollars and FTE





Interagency Coordination

- EPA works with the Committee on Natural Resources and the Environment and Sustainability (CENRS), including the U.S. Global Change Research Program (USGCRP), to coordinate research with other federal government agencies.
 - Focus on air quality research communication and federal research on climate change
 - USGCRP Climate health assessment (2016) with NIH, CDC, and NOAA
- In addition, the ACE program has several activities completed, underway, or planned with other agencies:
 - DISCOVER-AQ –collaboration with NASA on a five year study to better understand how to measure and forecast air quality from space
 - Southern Oxidant and Aerosol Study (SOAS) – Jointly-sponsored EPA and NSF field study in Alabama (summer 2013) that focused on aerosol impacts on air quality and climate interactions – analyses underway.
 - Wildfires (NOAA) – development of a coordinated plan within CENRS to address wildfires and climate change impacts (AQRS Charter for 2016)



Response to State Priorities

- Most State research needs are reflected in EPA program and Regional office priorities.
- Examples of Environ. Research Institute of the States (ERIS) needs identified to ACE

ERIS Need	ACE Response
Study how ozone level increases caused by unusual circumstances affect transport models and attainment decisions	Development of the Community Multiscale Air Quality (CMAQ) model
Work needed to keep AP42 and similar sources updated and available	Incorporation of new data into SPECIATE, EPA's repository of volatile organic gas and particulate matter speciation profiles of air pollution sources; harmonization of emission inventories
Impact of wildfires on health and air quality	Studies and publications on NC wildfires; expanded effort in wildfire monitoring and health impacts – esp EJ
Study air quality around oil and gas development to identify any pollution issues that need to be addressed	No ORD activity – hydraulic fracturing has been in the President's Budget the last several years but not enacted; implications of oil and gas emissions and air quality are linked to OAQPS and OECA needs
Research air quality and public impacts from open sand mining operations	No ORD activity

Cross Program Coordination

