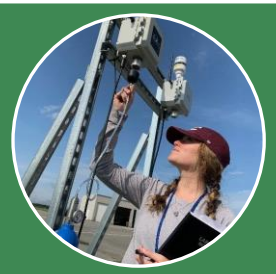
EPA's Air, Climate, and Energy Research Program

Sherri Hunt, Principal Associate Director
Air, Climate, and Energy (ACE) National Research Program
Office of Research and Development (ORD)
Environmental Protection Agency (EPA)

NACAA Coffee Break
May 8, 2024

EPA's Office of Research and Development

ORD's science informs decisions:



Science Products

Data

Methods

Tools

Models

Assessments

Science Translation

Training

Briefings

Action Development Process

Technical Assistance

Reports

Publication

Inter-Agency Work Groups

Decision-Making

Rule-making

Permitting

Environmental cleanup

Funding

Planning

Administrative actions

Legal/Enforcement actions

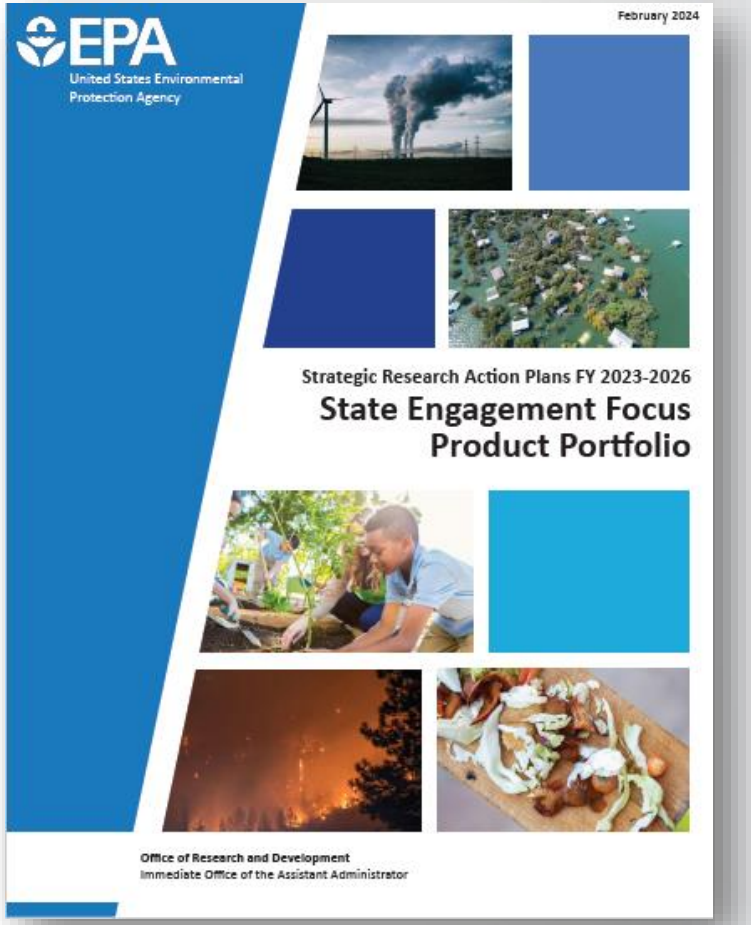
ORD → **PARTNERS**

ORD's Strategic Research Action Plans (StRAPs) are developed with input from many internal and external partners and stakeholders:

https://www.epa.gov/research/strategic-research-planning

State Engagement Focus Product Portfolio

- 124 research products across all research programs that are most closely aligned with state interests
- Portfolio finalized and shared with state partners mid-March
- National Program Directors (NPDs) are meeting with state associations to present portfolio and answer any questions
- Engage with our state & territorial partners and partnership groups throughout research implementation
- Pursue co-generation of research with states & territories where mutually beneficial and appropriate

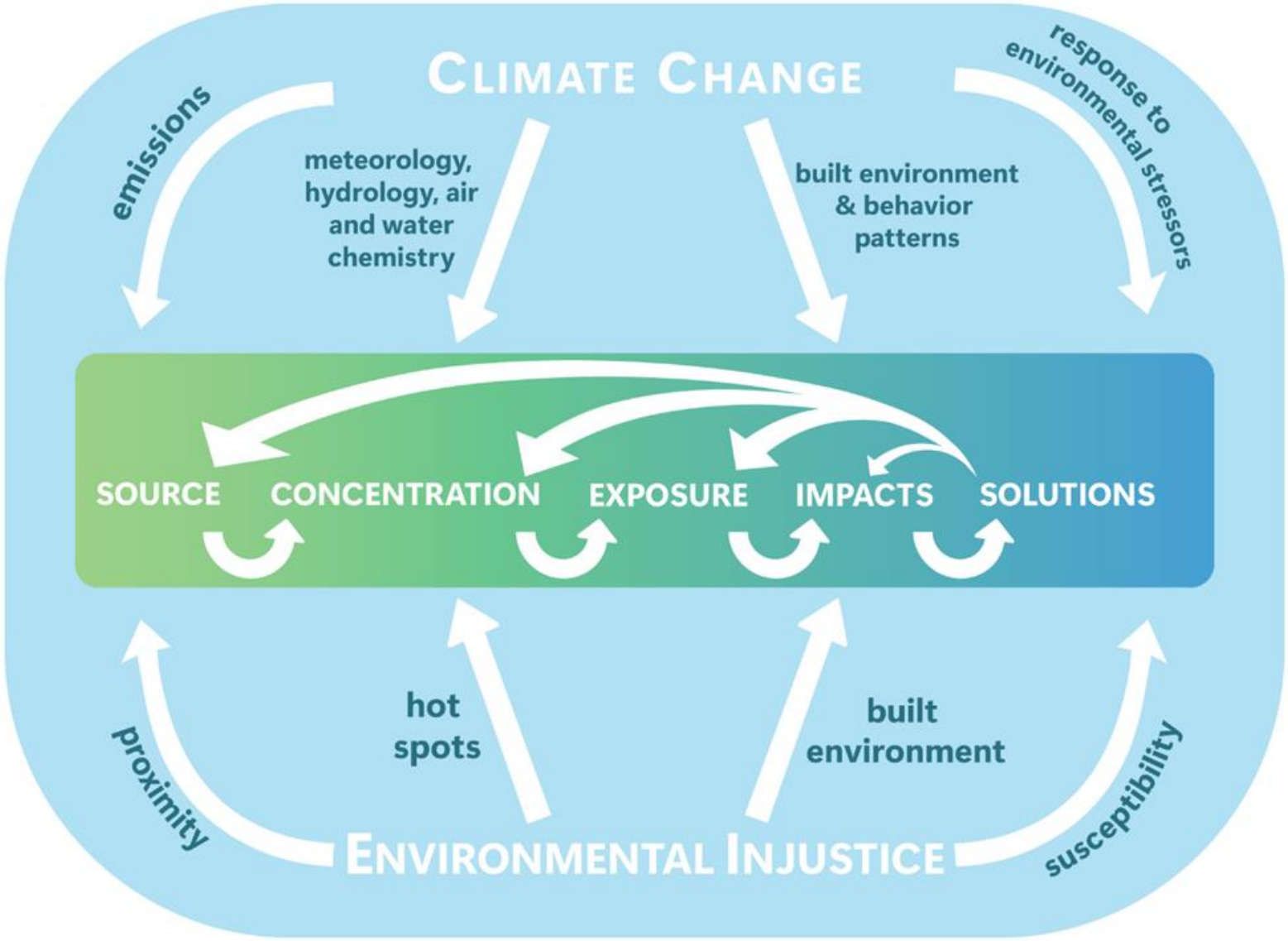


Read the State Engagement Focus Product Portfolio

Source-to-Impacts Continuum

Climate change and environmental injustice interact with human health

Holistic approach includes reducing environmental and health inequities **AND** responding to the impacts of climate change.



Next Generation Emissions Measurements (NGEM)

Measure air emissions from fugitive and area sources and for fenceline monitoring

Monitoring Approaches for VOC Emissions

Sensor Pods (SPods)

- SPods can automatically trigger a canister grab sample
- EPA's open-source version is commercially available
  - EPA Region 4 Program to loan commercial SPods to state, local, or Tribal partners
- Monitor fuel storage terminal emissions
  - Research near bulk terminals in Greensboro, NC
- In-plant leak detection analysis
  - Research in Corpus Christi, TX

SPod sensors can help identify unknown emissions, indicate source direction, speciate VOC plumes (with triggered cans), and inform decision-making on investigations and/or monitoring.
Credit: Jake Carpenter, EPA R4

Next Generation Emission Measurements: Helping to Improve Air Quality and Source Understanding
Webinar, October 17, 2023
Presenters: Eben Thoma & Rachelle Duvall

Sensor Pods for Volatile Organic Compound Fenceline Monitoring and Data Analysis
Webinar, December 1, 2022
Presenters: Eben Thoma & Megan MacDonald

New Air Monitoring Technology to Understand Leaks and Irregular Emissions - Science Matters, October 11, 2022

Emissions Measurements

Understand air emissions from landfills

Monitoring Approaches for Landfill Emissions

Intramural research

- Understanding and Control of Air Emissions from Landfills
  - Improve measurement approaches for identifying and mitigating surface leaks and quantifying total emissions from landfills.
  - Compare on-the-ground information on waste characteristics and landfill management practices with aerial measurements.
  - Assess and improve existing data and models (e.g., GHG Inventory and GHGRP).
  - Cusworth et al. (2024) *Quantifying methane emissions from United States landfills,* Science

Regional research (Region 5)

- Field test (first) in Summer 2022.
- Additional field work and analysis to understand how topography, design and operating changes, waste composition variation, and other factors affect fugitive emissions and how to best measure for leaks and total emissions.

External research under the Science to Achieve Results (STAR) grant program

- EPA Awards $4.6M in Research Grants to Quantify and Mitigate Emissions from Municipal Solid Waste Landfills
- Recipients (abstracts available)
  - **University of Delaware** (PI Paul Imhoff) - Evaluation and Control of Emissions from Municipal Solid Waste (MSW) Landfills: Direct Measurement and Modeling
  - **University of Miami** (PI Jaiyu Li) - Integrating Multi-Source Data for Landfill Methane Emission Quantification
  - **University of Wisconsin** (PI James Schauer) - Analysis of Continuous Monitoring Data with Inverse Atmospheric Models to Improve Landfill Gas Emissions Data and Elucidate Drivers of Emissions
  - **University of Colorado, Boulder** (PI Michael Hannigan) - Integrating Measurements Across Platforms to Feasibly Assess Emissions and Mitigation of Methane and VOCs from Landfills
  - **University of California, Berkeley** (PI Dimitrios Zekkos) - Next-Generation Landfill Monitoring: A Multi-Scale Approach to Measuring Emissions for Evaluating and Financing Interventions

Contaminants of Immediate and Emerging Concern

PFAS measurement methods and model updates

Method updates

- **Field evaluations of OTM-45**
  - Measurement of PFAS at two industrial facilities (a sewage sludge incinerator (SSI) and a pilot-scale aqueous film forming foam (AFFF) thermal treatment facility)
  - Other Test Method 45 (OTM-45) Measurement of Selected Per- and Polyfluorinated Alkyl Substances from Stationary Sources
- **OTM-50** (released January 2024)
  - Analysis of multiple short-chain volatile fluorinated compounds (VFCs) indicative of incomplete decomposition of PFAS from thermal treatment control technologies
  - Other Test Method 50 (OTM-50) Sampling and Analysis of Volatile Fluorinated Compounds from Stationary Sources Using Passivated Stainless-Steel Canisters and presentation at AWMA's The Science of PFAS Conference (January 23-24, 2024)
- **OTM-55** (under development)
  - Analysis of non-polar semi-volatile and non-volatile PFAS compounds, including fluorotelomer alcohols (FTOHs) and PIC/Ds.

Modeling updates

- Predictions of PFAS regional-scale atmospheric deposition and ambient air exposure December 2023
- Characterizing Air Emissions, Transport, and Deposition of PFAS from a Fluoropolymer Manufacturing Facility January 2021

PFAS and Emerging Contaminant Technology Transfer to States and Tribes - October 18, 2023
Presenters: Tim Buckley and Jon Sobus

EPA PFAS Strategic Roadmap: Research Tools and Resources - August 17, 2022
Presenters: Alice Gilliland, Laura Carlson, Avanti Shirke, and Phillip Potter

Modeling PFAS Air Emissions, Chemistry, and Deposition - May 18, 2021
Presenters: Emma D'Ambro and Ben Murphy

Ethylene Oxide (EtO)

Measurement updates

- Ambient and Source measurement methods
  - Method TO-15A (ambient measurements)
  - EtO field ambient method evaluation - presented at AWMA Air Quality Measurement Methods and Technology Conference, November 2023
- EtO GMAP Canister QC Data for NEIC and NEIC report
- Assessment of chemical facility ethylene oxide emissions using mobile and multipoint monitoring (Atmospheric Environment X, April 2023)
- Verona EtO Air Monitoring Study –
  - Phase 1: 4-month field study in Verona, MO (October 5, 2022 - January 30, 2023)
  - 24-hour EtO canister samples at three sites near facility (interim public results, July 19, 2023)
    - Site 1 was north of fenceline and downwind; Sites 2 and 3 were in community and southwest of facility
  - Phase 2: another field study (coming soon)

Regional Research (active projects)

- Ambient ethylene oxide quantification in overburdened communities near facilities using innovative measurement technologies
  - EPA Regions 2, 5, 7 with study locations in Puerto Rico near a sterilizer facility, at an established air toxics monitoring site in R5, and in Kansas City, KS near a chemical facility.
  - Complementary project to build capacity on methods to detect EtO at lower levels in the field.

www.epa.gov/hazardous-air-pollutants-ethylene-oxide

6-ppd quinone

Emissions from Motor Vehicles via Brake and Tire Wear

- Understanding Airborne Emissions and Health Impacts of 6-ppd quinone from Tires
  - Speciation of emissions including PM and other compounds, e.g., 6ppd-quinone, metals

Regional Research (active projects)

- Understanding Airborne Emissions and Health Impacts of 6PPD from Tires
  - Complementary project to build capacity on methods to detect EtO at lower levels in the field.
  - EPA Region 3 with study locations in DC, VA, and NC.
  - 2023 Pathfinder Innovation Project awards

https://www.epa.gov/chemical-research/6ppd-quinone

Wildfire Smoke

Smoke from Fires

Emissions from Combustion of Materials in the Urban Environment

- Characterize Emissions from WUI Fires
  - WUI = Wildland Urban Interface (i.e., burning structures and vehicles)
  - Study will use both laboratory and field measurements.
  - Compile emission factors for criteria and toxic air pollutants.
  - Non-targeted analysis for PFAS in ash from WUI fires

Air Sensor Resources

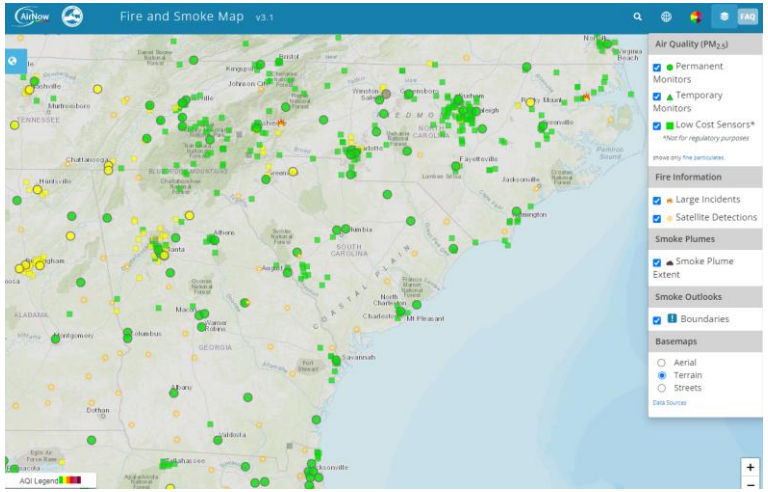
The Wildfire Smoke Air Monitoring Response Technology (**WSMART**) pilot

- **Air Sensor Loan Program** for state, local, and Tribal air agencies affected by wildfire smoke.

ThingyAQ $PM_{2.5}$, CO, VOC sensor

Vehicle Add-on Mobile Monitoring System (VAMMS) $PM_{2.5}$

PurpleAir $PM_{2.5}$ sensor



AirNow Fire and Smoke Map

- Uses correction factor for PurpleAir $PM_{2.5}$ sensors.
- Allows display of both regulatory monitor and sensor data.

AirNow Fire and Smoke Map: Extension of the US-Wide Correction for PurpleAir PM2.5 Sensors - May 19, 2021

Presenters: Andrea Clements, Amara Holder, and Karoline Barkjohn, EPA ORD; Ron Evans, EPA OAR; and Sim Larkin, US Forest Service

Wildfire Impacts on Water and Ecosystems

Mapping Watershed Resilience to Climate-related Floods, Droughts and Wildfire

Resilience of Ecosystems in a Changing Climate Webinar
(November 16, 2021)

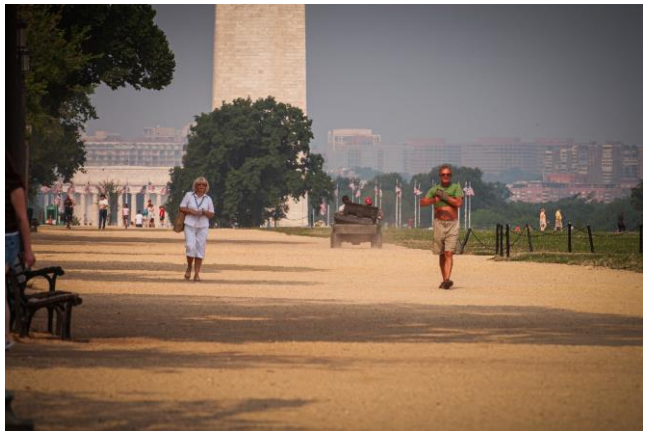
Reducing Impacts of Wildfires on Hydrologic and Water Quality

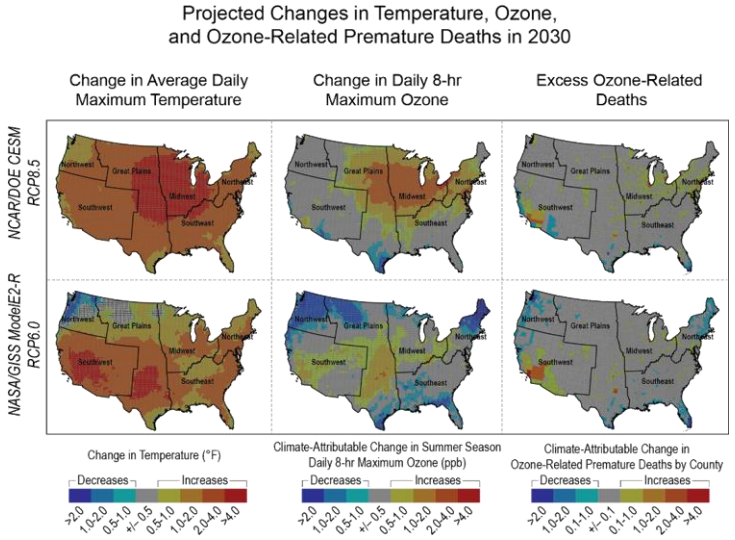
Science Matters article
(September 2021)

Climate, air pollution, and equity

Impacts of Climate Change-related Extreme Weather Events on Health Outcomes

Understanding Extreme Weather Events: Impacts of Extreme Precipitation and the Urban Heat Island – May 21, 2024





Assessing the Impacts of Changing Environmental Conditions on Air Quality and Human Health

Climate Change Impact on Ozone and Health (Science Matters, February 2022)

Effects of Historical Redlining on Climate and Health

Environmental Justice

While air quality has improved across the U.S., the health burdens of air pollution are still disproportionally borne by communities with environmental justice concerns.

Odor Explore

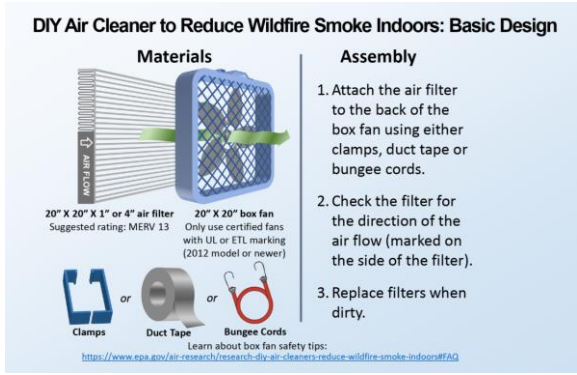
- Analysis of VOCs using passive samplers in Rubbertown (industrial area of Louisville, Kentucky.
- Persistent odors (some due to HAPs and VOCs) can be a nuisance, may cause a health concern, and are of particular concern to nearby communities, including substantial EJ populations.

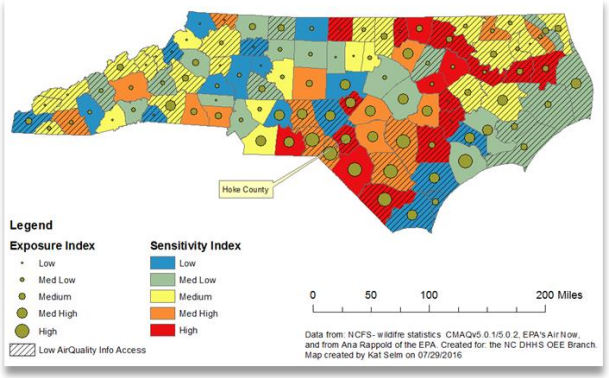
Wildfire Study to Advance Science Partnerships for Indoor Reductions of Smoke Exposures (Wildfire ASPIRE) Study

- Explore air cleaning and ventilation practices and impacts on indoor air quality during wildfire events in Missoula, Montana and Hoopa Valley Tribe, California, and community in central California with environmental justice concerns.
- Common recommendation to reduce exposure is to go indoors, but wildfire smoke ($PM_{2.5}$) can infiltrate.

Do-It-Yourself Air Cleaners: Making Cleaner Air More Accessible
Science Matters, September 6, 2023

Planning Framework for Protecting Commercial Occupants from Smoke During Wildfire Events (American Society of Heating, Refrigerating and Air-Conditioning Engineers, ASHRAE)



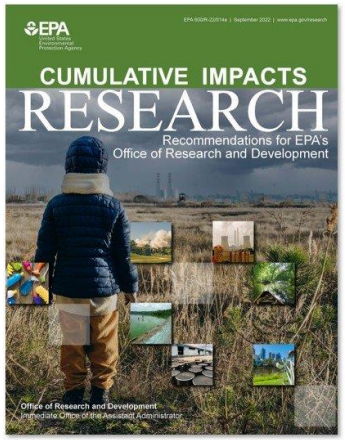


Community Health Vulnerability Index

- Tool for public health officials to identify communities at higher risk from wildfire smoke.
- Translated for use in North Carolina.
- Jung et al., 2024, *Advancing the community health vulnerability index for wildland fire smoke exposure*, Science of the Total Environment

Cumulative Impacts

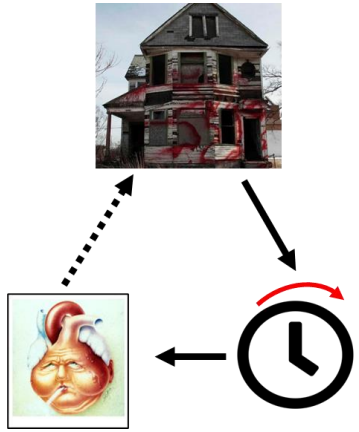
Cumulative impacts are the totality of exposures to combinations of chemical and non-chemical stressors and their effects on health, well-being, and quality of life outcomes.



Cumulative Impacts Research Recommendations

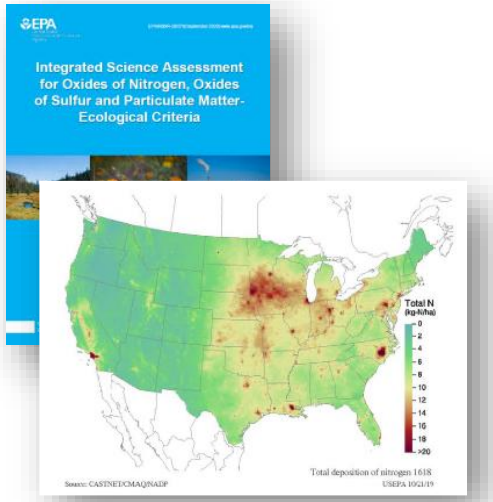
- Cumulative impacts are a part of the larger conversation around environmental justice (EJ).

Cumulative Impacts of Multiple Neighborhood Stressors on Accelerated Aging



- How might accelerated aging and air pollution jointly increase cardiovascular health risks?
- Assess epigenetic aging
- Evaluate built environment of a neighborhood (17 variables)
- Outcomes:
  - Neighborhood environment had a strong impact on accelerated epigenetic aging.
  - Significant interaction between accelerated aging and traffic-related air pollution.
  - Those with accelerated aging may be at increased environmental health risks.

Use of Electronic Health Records to Address Pressing Environmental Health Concerns – April 20, 2022
Presenter: Cavin Ward-Caviness, EPA/ORD

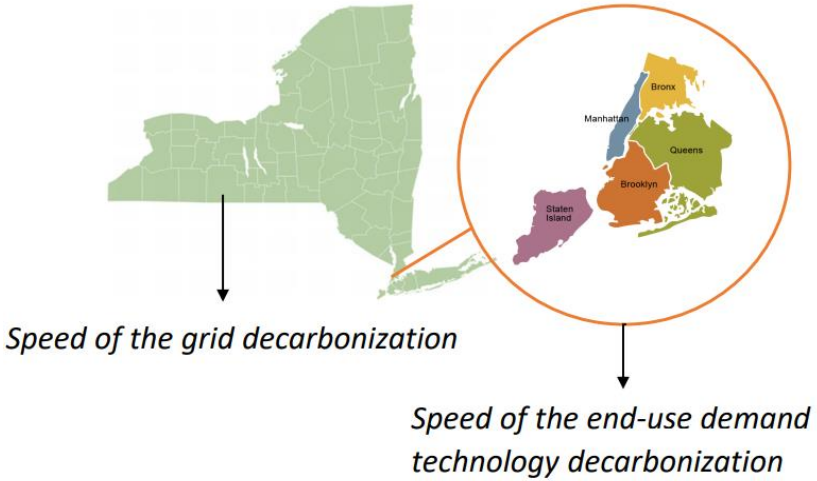


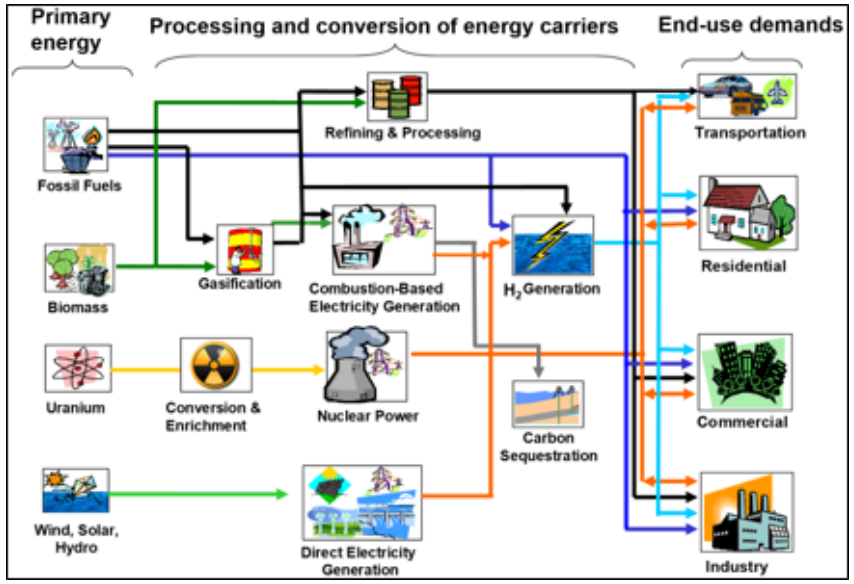
Cumulative Impacts of Criteria Air Pollutants

Integrated Science Assessment (ISA) for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter - Ecological Criteria

- Scientific foundation for the review of the secondary National Ambient Air Quality Standards (NAAQS) for NOx, SOx and PM)
- Outcomes:
  - Abundant evidence to support that unique multipollutant exposures to criteria pollutants cause differential effects in a range of ecosystem types.
  - Key ecological processes are vulnerable to modification by climate.
  - Robust resource to conduct policy assessments.

Modeling Decarbonization across the Full Energy System





Modeling tools for at the US and State-level for decarbonization and air quality

GLIMPSE
Air-Climate-Energy Planning Tool

https://www.epa.gov/air-research/glimpse-computational-framework-supporting-state-level-environmental-and-energy

Modeling energy systems at the city and community scale

Science Matters article (December 2021)

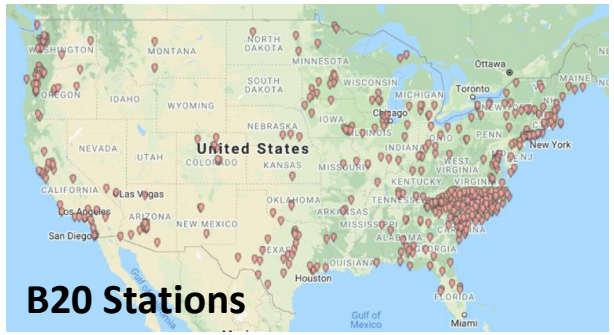
Tools for Helping State and Municipal Decision Makers Make Air, Quality, and Climate Objectives: GLIMPSE and COMET – Presenters: Dan Loughlin, Ozge Kaplan, August 15, 2023

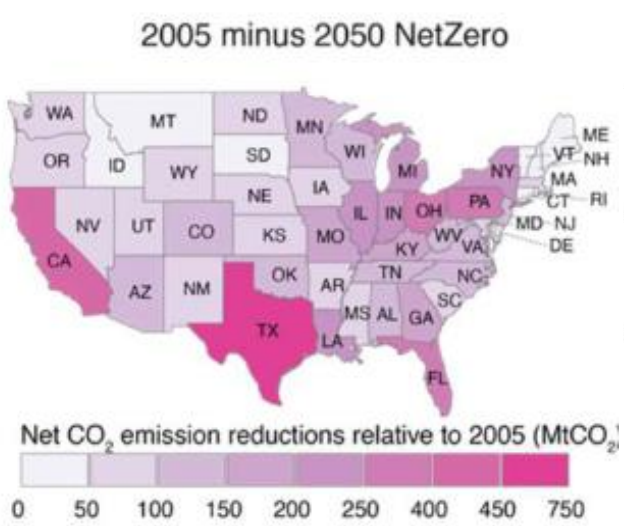
Serious Games for engagement on energy choices

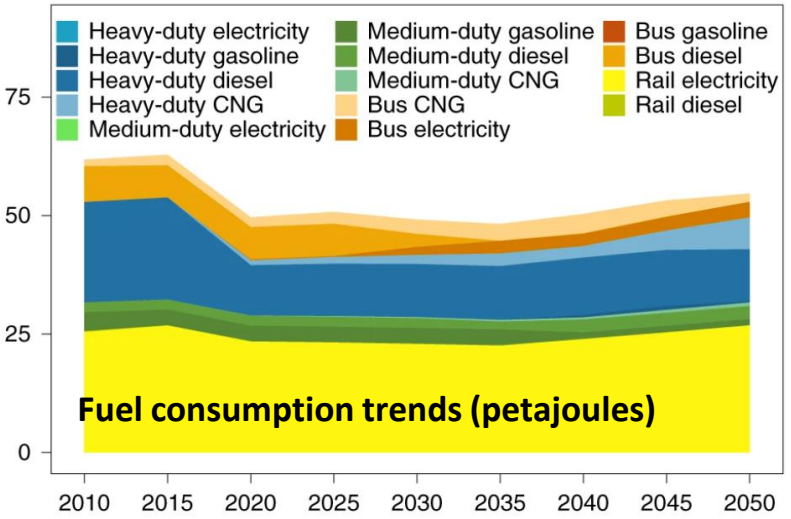
GENERATE
The Game of Energy Choices

https://www.epa.gov/climate-research/generate-game-energy-choices

A Changing Transportation System







Report to Congress on Biofuels and the Environment

https://www.epa.gov/risk/biofuels-and-environment

State-level CO_2 reductions under US Net Zero targets (GLIMPSE)

https://doi.org/10.1016/j.egycc.2023.100117

Decarbonization in NY City across many transportation modes (COMET)

https://www.nature.com/articles/s41560-020-00740-2

Serious Games for Transportation

https://www.epa.gov/air-research/air-quality-and-energy-choice-stem-activities-educators

Nature-Based Solutions

Nature-based Solutions for Climate Adaptation and Mitigation

Science Matters article
(February 2022)

Potential of Wetlands for Carbon Sequestration

Carbon Sequestration Potential of Coastal Natural Infrastructure in the Chesapeake Bay

Urban Green Infrastructure Design and Assessment

Science Matters article
(May 2022)

US EPA Science to Achieve Results (STAR) grants

Air Quality Information: Making Sense of Air Pollution Data to Inform Decisions in Underserved Communities Overburdened by Air Pollution Exposures Funding Opportunity

- EPA is soliciting applications for community-engaged research in underserved communities to advance the use of air pollution data and communication of air quality information for empowering local decisions and actions that address community-identified air pollution concerns.
- Open until June 26, 2024. More information

Understanding and Control of Municipal Solid Waste Landfill Air Emissions

- EPA awarded $4.6 million in grant funding to five institutions to quantify and mitigate municipal solid waste landfill emissions. More information

Drivers and Environmental Impacts of Energy Transitions in Underserved Communities

- EPA awarded $11 million in grant funding to eleven institutions for research to address the drivers and environmental impacts of energy transitions in underserved and Tribal communities. More information

Measurement and Monitoring Methods for Air Toxics and Contaminants of Emerging Concern in the Atmosphere

- EPA awarded seven grants to support research to advance measurement and monitoring methods for air toxics and contaminants of emerging concern in the atmosphere. More information

Interventions and Communication Strategies to Reduce Health Risks of Wildland Fire Smoke Exposures

- EPA awarded over $9 million in funding to twelve institutions for research that will address behavioral, technical and practical aspects of interventions and communication strategies to reduce exposures and health risks of wildland fire smoke. More information

Contact

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2024 Air, Climate, and Energy Research Webinar Series:

- **Feb 20:** *Cleaner Indoor Air During Wildfires Challenge - Phase 2 Winners* | Sarah Coefield & Emily Snyder (CPHEA)
- **Mar 19:** *Wildfire Impacts: Beyond Ambient PM2.5* | Steve LeDuc (CPHEA) & Amara Holder (CEMM)
- **May 21:** *Understanding Extreme weather events: impacts of extreme precipitation and the urban heat island* | Ana Rappold (CPHEA) & Tanya Spero (CEMM)
- **Aug 20**: *What are the air pollution health impacts beyond cardiovascular and respiratory?* Kristen Rappazzo & Anne Weaver (CPHEA)
- **Nov 19:** *Methane from US Landfills* | Susan Thorneloe (CESER)

EPA's Mission: Protect Human Health and the Environment

Follow the Science

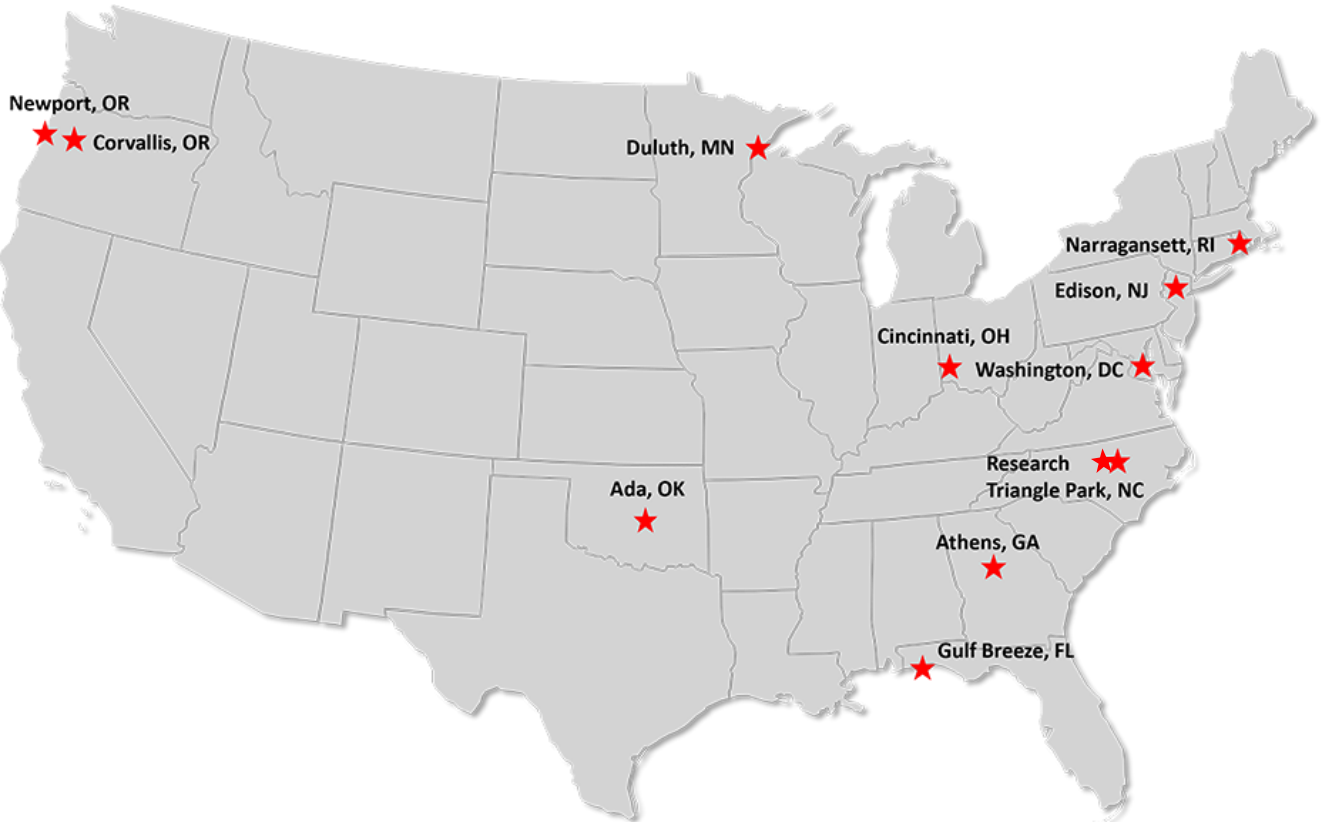
Follow the Law

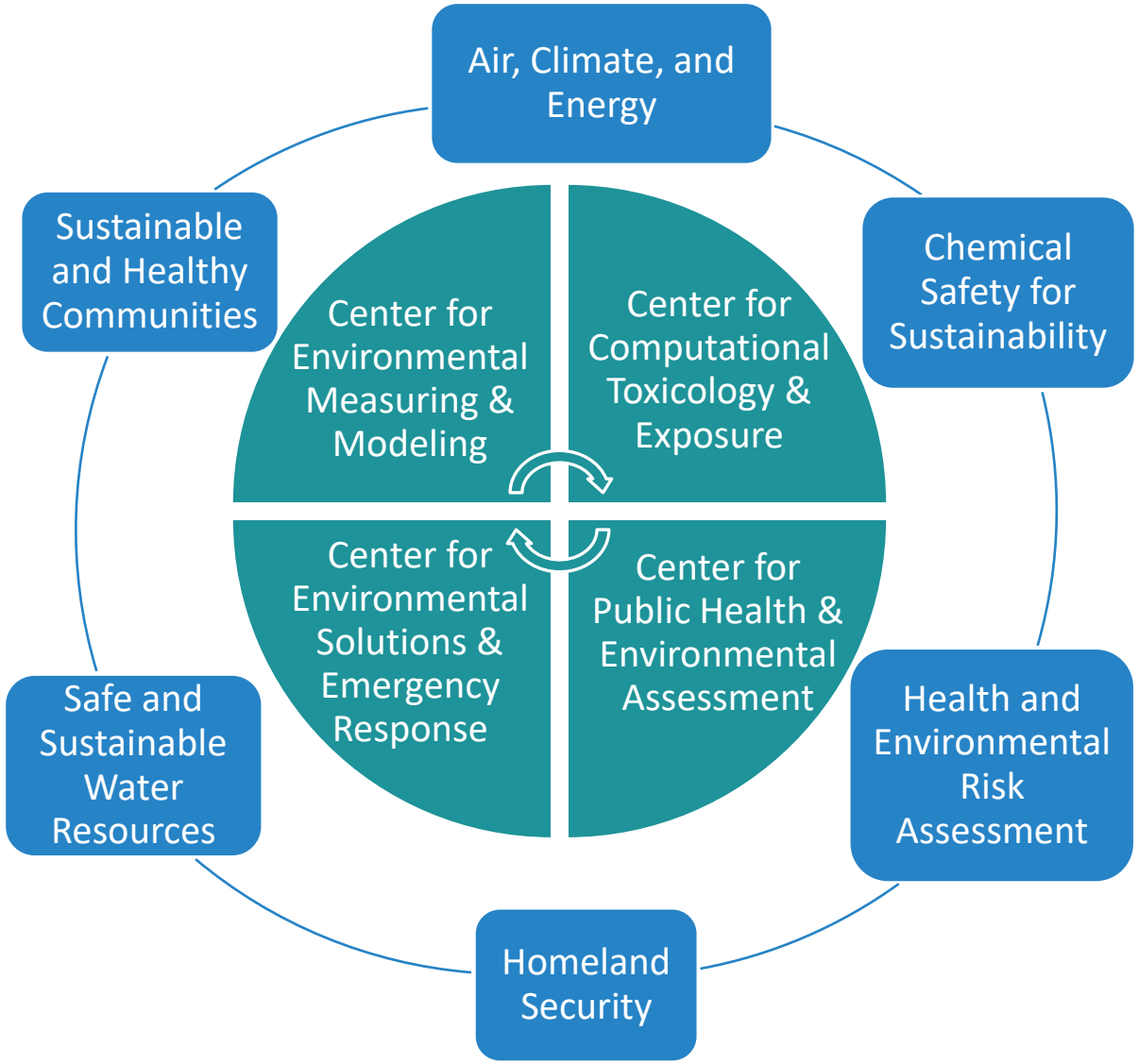
Advance Justice and Equity

Be Transparent

US EPA's Office of Research and Development (ORD)

Mission:
Provide leading-edge research to inform Agency decisions and support the emerging needs of EPA stakeholders, including state, tribal, and community partners.

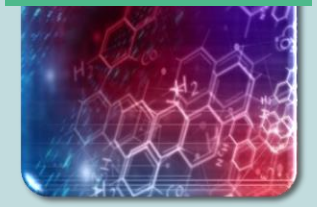




Staff and researchers in 6 National Research Programs and 4 Centers are in labs and offices across the U.S.

ORD Cross-Cutting Issues

Where appropriate, ORD's six National Research Programs (NRPs) will work together through joint and targeted engagement activities with key Agency partners, external partners, and stakeholders to ensure that ORD's research portfolio appropriately addresses key topic areas.

Cumulative Impacts	Children's Environmental	Contaminants of Emerging Concern	Environmental Justice	Climate Change	Community Resilience
					
Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time.	Inform public health decisions and scientific understanding of potential early life susceptibility to environmental stressors, and community efforts that create sustainable and healthy environments protective of children's health.	Includes chemical substances that may cause ecological or human health impacts and are either known contaminants of increased priority or newly identified contaminants.	Coordinated efforts to better understand health disparities from unequal environmental conditions, including impacts from climate change and exposures to pollution and inequitable social and economic conditions.	Integration, where appropriate, to avoid duplicative efforts, fills critical gaps, and provides results that reflect the multiplicity of impacts and needs associated with climate change.	Develop and implement methods that increase the sustained ability of a community to use available resources to respond to, withstand, and recover from adverse situations.

Air, Climate, and Energy Team

National Program Director Staff

Bryan Hubbell
National Program Director

Sherri Hunt
Principal Associate National Program Director

Rebecca Dodder
Associate National Program Director for Climate

Angie Shatas
Associate National Program Director

Connections to Centers, Offices, and Regions

Center for Environmental Measurement and Modeling (CEMM)

Alice Gilliland
Acting Director

Tiffany Yelverton
Assistant Center Director

Center for Public Health and Environmental Assessment (CPHEA)

Wayne Cascio
Director

Tom Long
Assistant Center Director

Darrell Winner
Senior Science Advisor

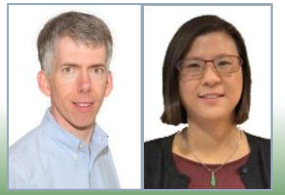
Peter Beedlow
Ecologist, Pacific Ecology Systems Division

Center for Environmental Solutions and Emergency Response (CESER)

Greg Sayles
Director

Tim Canfield
Assistant Center Director

Office of Science Policy and Engagement (OSAPE)



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Serena Chung
Extramural Research Lead for ACE

Lead Region RSL (R2)

Mindy Pensak
Regional Science Liasion

Office of Resource Management

Hyon Kim

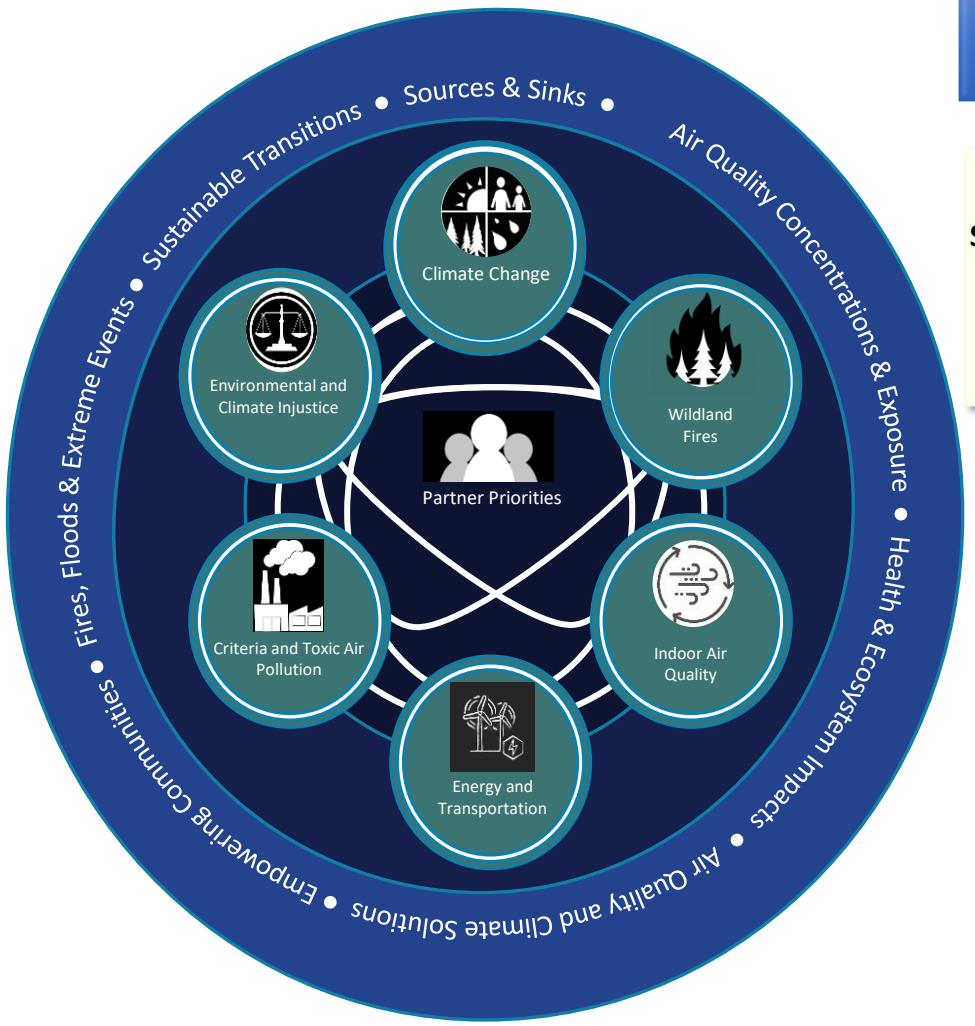
Program Support

Bailey Stearns
Communications for ACE

Elizabeth Sams
Program Analyst

Air, Climate, and Energy Research Program

A holistic vision to reduce environmental and health inequities AND respond to the impacts of climate change.



Topic 1: <u>UNDERSTANDING</u> Air Pollution and Climate Change and Their Impacts on Human Health and Ecosystems

Research Area 1: **Sources and Sinks** of Air Pollution and Climate Forcers

Research Area 2: **Air Quality Concentrations and Exposure** Characterization: Measurements

Research Area 3: **Air Quality Concentrations and Exposure** Characterization: Modeling

Research Area 4: Health **Impacts** of Air Pollution and Climate Change

Research Area 5: Ecosystem **Impacts** of Air Pollution and Climate Change

Topic 2: <u>RESPONDING</u> to Risks and Impacts and Preparing for the Future

Research Area 6: Scientific Support for Climate Change and Air Quality Policy Solutions

Research Area 7: Empowering communities and individuals to improve public health

Research Area 8: Responding to Risks of Fires, Floods, and Other Extreme Events

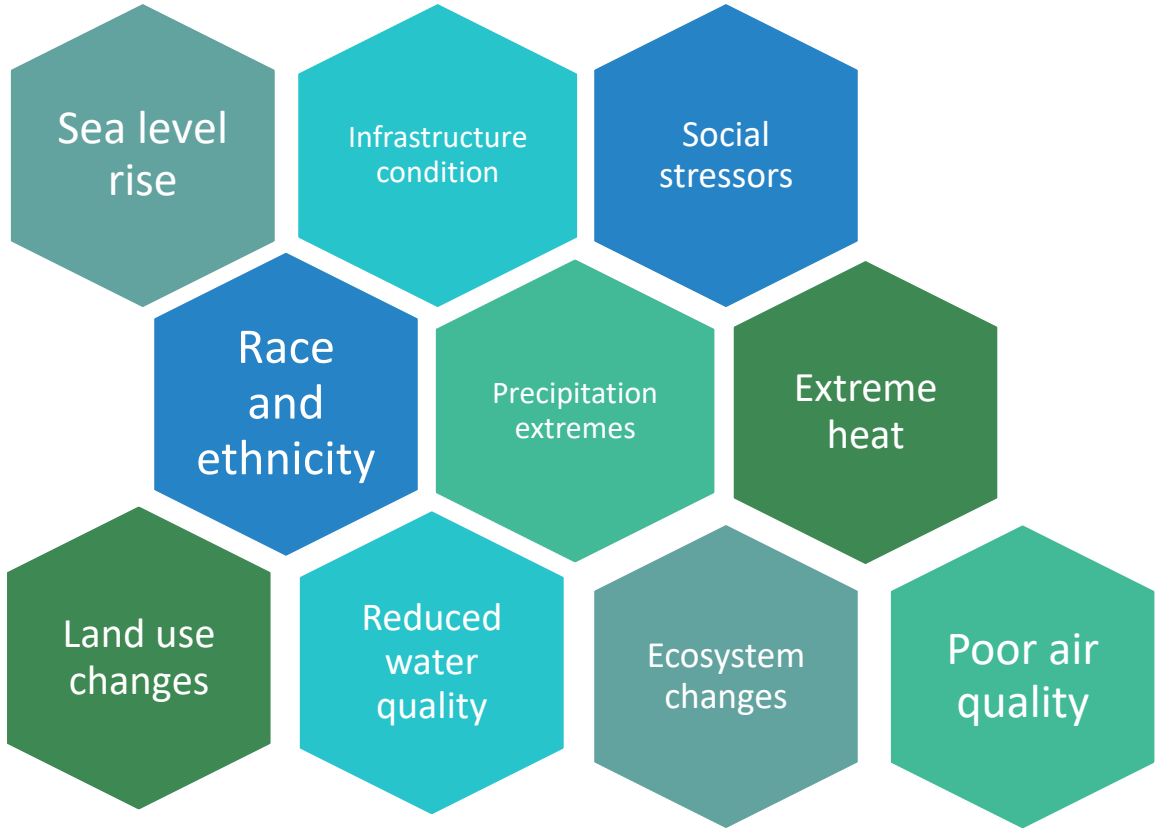
Research Area 9: Transitions to a Sustainable Future

Impacts change

Impacts on health are complex, often indirect, and dependent on multiple societal and environmental factors.

How can we do research that supports adaptation planning and resilience building?

Integrating social science is key.



Cumulative Impacts, Equity, and Environmental Justice

Equity/Environmental Justice is a priority of the Biden Administration

- President Biden signed four Executive Orders:
  - EO 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
  - EO 14008: Tackling the Climate Crisis at Home and Abroad
  - EO 14091: Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
  - EO 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All
- EPA Administrator Regan issued an Agency-wide directive to better serve historically marginalized communities using cumulative impact assessment.

Commitment to Environmental Justice for All

On April 21, 2023, President Biden signed the Executive Order on **Revitalizing Our Nation's Commitment to Environmental Justice for All**

Designates an Environmental Justice Subcommittee within the Office of Science and Technology Policy (OSTP) under the National Science and Technology Council (NSTC)

Sec. 5. Research, Data Collection, and Analysis to Advance Environmental Justice.

- To **address the need for a coordinated Federal strategy to identify and address gaps in science, data, and research related to environmental justice**, the OSTP Director shall establish an Environmental Justice Subcommittee of the NSTC

National Science and Technology Council Environmental Justice Subcommittee

1. The EJ Subcommittee and the White House Environmental Justice Interagency Council shall hold an **annual summit on the connection of science, data, and research with policy and action on environmental justice.**

2. The EJ Subcommittee shall prepare, and update biennially, a coordinated **Federal Environmental Justice Research Strategy:**

    a. Analyze **EJ-related gaps and inadequacies in data collection and scientific research to address cumulative impacts**, with a focus on gaps and inadequacies that may affect agencies' ability to advance EJ
    b. Identify **opportunities to coordinate** with the research efforts of State, Tribal, territorial, and local governments, and others
    c. Provide recommendations to the Committee on Environmental Quality (CEQ) Chair on data sources in the **Climate and Economic Justice Screening Tool**

Air Quality and Community Health Research Coordination Subcommittee (ACRS)

Air quality and Community health Research Coordination Subcommittee (ACRS)

- Goal: Coordination of air quality research in support of assessing air quality and associated community level health impacts and exposure disparities, with a focus on communities with environmental justice concerns and historically underserved communities
- Reincarnation of the Air Quality Research Subcommittee (AQRS) which existed from the 1990s until 2018
- Established by the Office of Science and Technology Policy (OSTP) and the National Science and Technology Council (NSTC)
- Co-chaired by EPA, the National Oceanic and Atmospheric Administration (NOAA), the National Institute of Environmental Health and Safety (NIEHS), and OSTP

Participating Agencies:

- CDC, DOE, HHS, DOT, EPA, NOAA, NASA, NIEHS, NIA, NSF

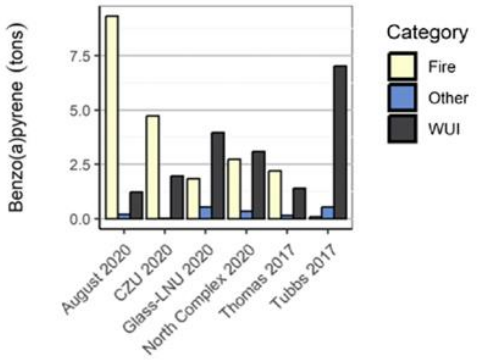
Regular Monthly Meetings:

- Meetings includes a 20-minute presentation on a topic to increase the awareness of connections across agencies, group discussions, and planning for future activities

Wildfire Smoke

Intersection of Characterizing Wildfire Smoke, Air Quality, and Health Impacts

Wildland – Urban Interface (WUI) Fires

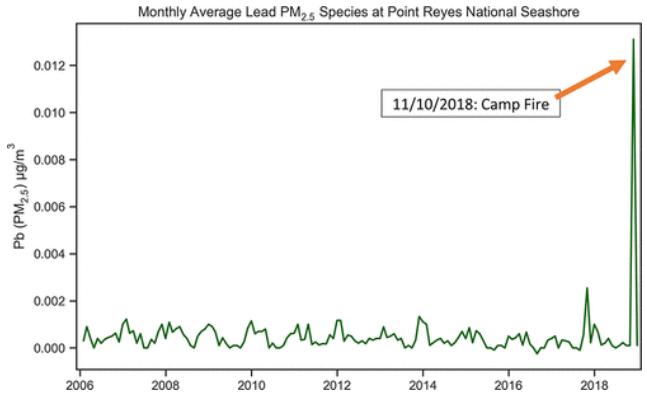


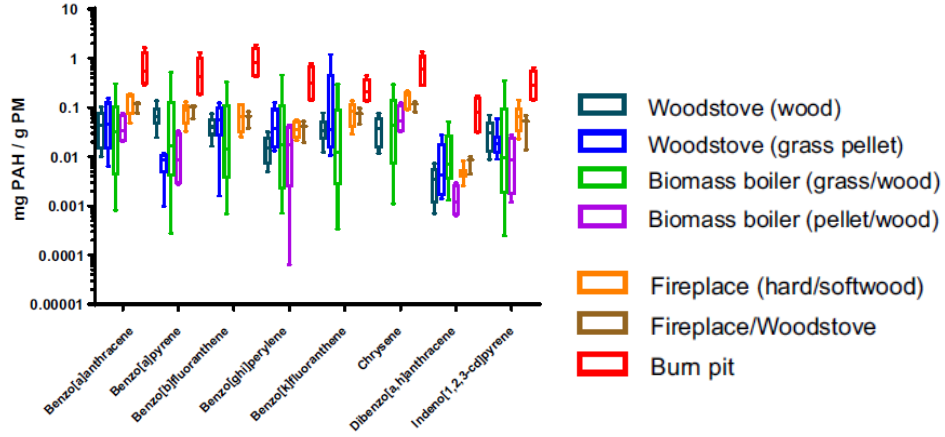
Emissions Factors

Holder et al. (2023). *Hazardous air pollution emissions estimates from wildfires in the wildland urban interface*. PNAS Nexus.

Air Quality Analyses

Boaggio et al. (2022). *Beyond Particulate Matter Mass: Heightened Levels of Lead and Other Pollutants Associated with Destructive Fire Events in California*. Environ. Sci. Technol.





Experimental Studies

Kim et al. (2021). *Chemistry, lung toxicity and mutagenicity of burn pit smoke-related particulate matter*. Particle and Fibre Tox.

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Emissions Measurements

Understand air emissions from landfills, storage tanks, and reservoirs

Storage tanks

Landfills

Fenceline monitoring

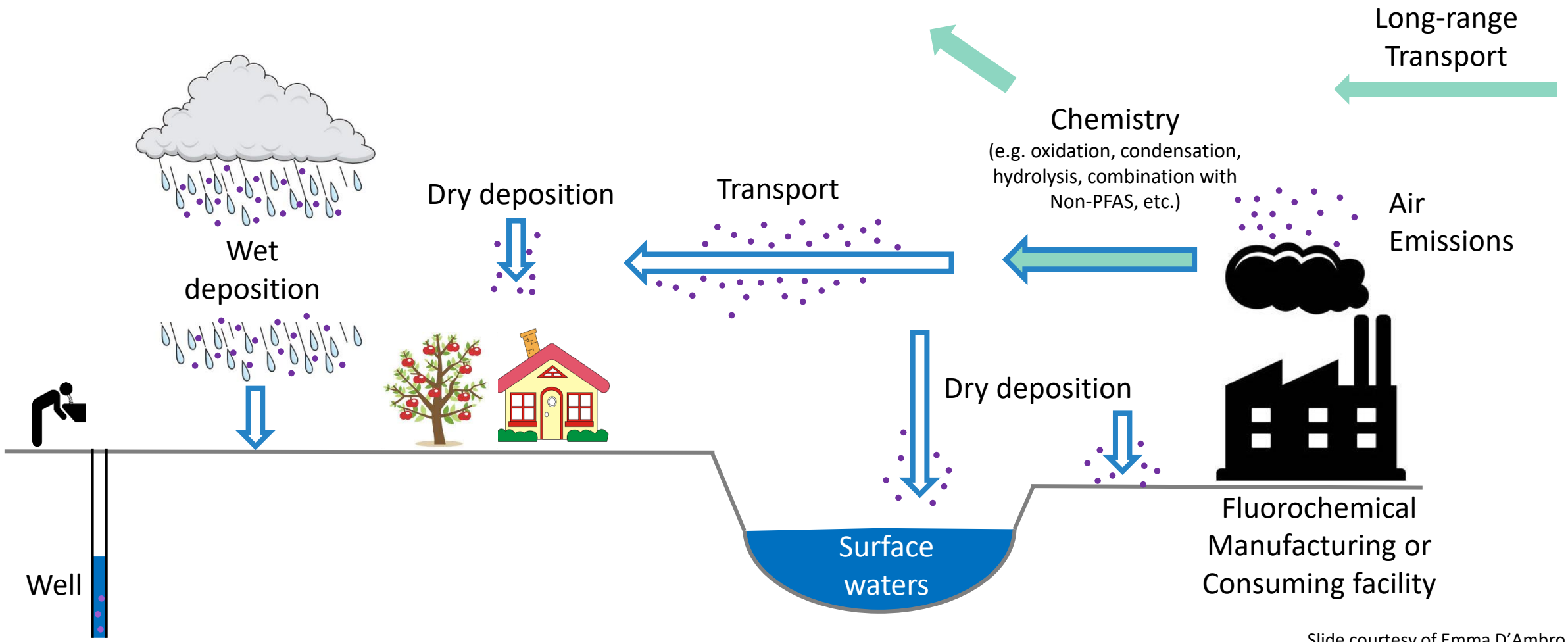
Commercial versions of EPA ORD's open-source design SPod fenceline sensor now in use around oil and gas pads in Colorado.

Reservoirs

[Science Matters article](#)
(January 2022)

PFAS in Air

Research on Per- and Polyfluoroalkyl Substances (PFAS)



Slide courtesy of Emma D'Ambro, US EPA

Electronic Health Records

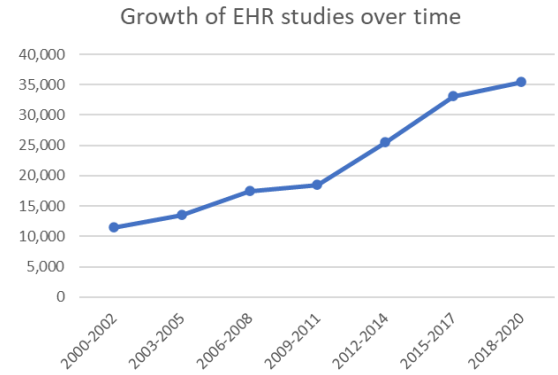
Electronic health records (EHRs) allow researchers to rapidly construct cohorts relevant to pressing environmental health concerns and how environmental risks differ for individuals.

Electronic Health Records (EHRs)

- There is a rise in the use of EHRs in health studies
- Research projects for EHRs can answer questions related to:
  - Vulnerable populations
  - Longitudinal Analyses
  - Hospital Utilization
  - Social + Chemical environment
  - Precision Medicine / Precision Environmental Health

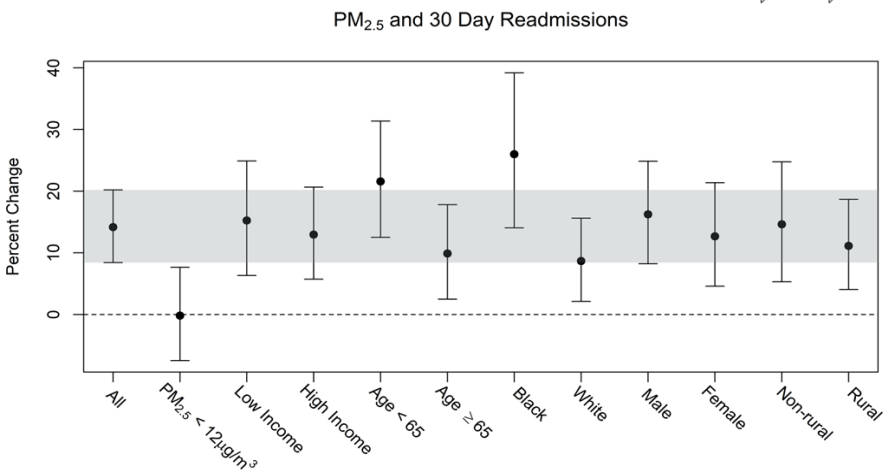
Patient ID	Visit Date	ICD-10 Code	Clinical Lab	Vitals
A	March 1 2000	I10; K45.0	3.4	89
B	Feb 4 2020	J01.3	5.6	103
C	August 19 2014	I11	19.2	79
D	August 19 2014	I10	1.3	98

Patient ID	Age	Sex	Address
A	23	M	123 Main St
B	78	F	45 East Ave
C	67	F	9 Broad Dr
D	34	U	4 West St



PM2.5 and hospital readmission

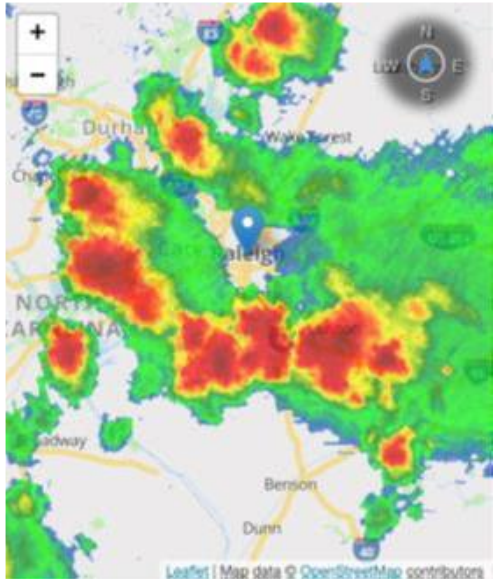
- Studied 20K heart failure patients examined for 12 years for long-term PM2.5-related readmission risks
- Found increased PM2.5 risks for all types of hospital interactions – not just hospitalizations – with risks 40% greater for black patients.



Use of Electronic Health Records to Address Pressing Environmental Health Concerns – April 20, 2022

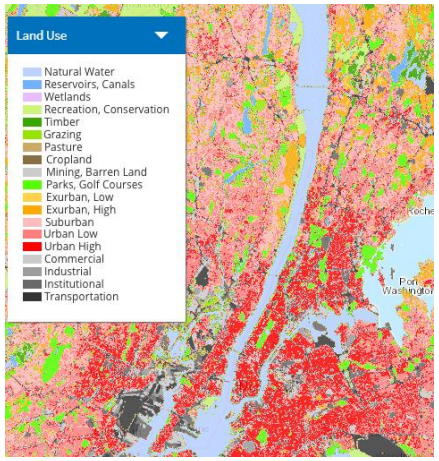
Presenter: Cavin Ward-Caviness, EPA Office of Research and Development

Climate Data and Extreme Events

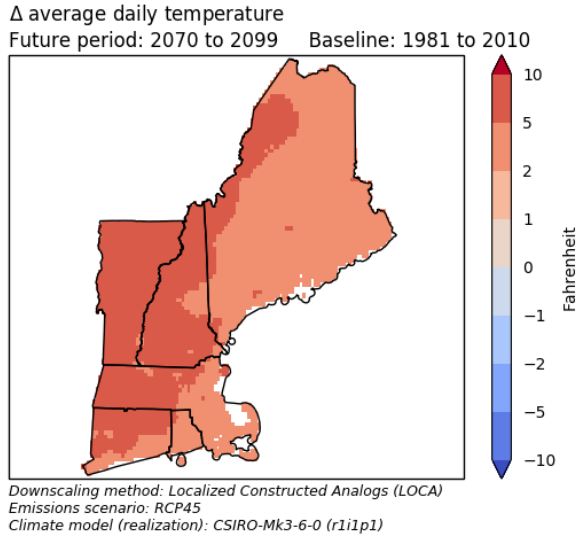


Downscaled Future Climate Data to Inform Responses to Extreme Events

Mallard et al., 2023 *Dynamically Downscaled Projections of Phenological Changes across the Contiguous United States*
Journal of Applied Meteorology and Climatology



ICLUS – Land use and population



LASSO - Climate scenarios

Web-accessible tools to visualize and compare spatial data and updating climate change and sea-level rise scenarios

Global Change Explorer: https://www.epa.gov/gcx

Tools for Adaptation Planning (LASSO and ICLUS) Webinar
August 1, 2024