



# Sustainable and Healthy Communities (SHC) Research Program

U.S. EPA's Office of Research and Development

Presentation to the BOSC  
July 16, 2015

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# SHC's Vision & Priorities



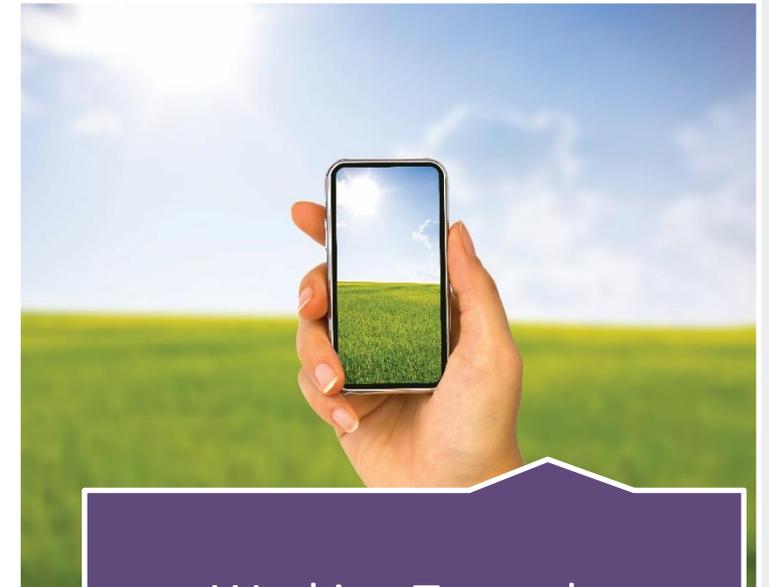
# EPA Strategic Priorities



Working to Make a Visible  
Difference in Communities



Cleaning Up Communities  
and Advancing Sustainable  
Development

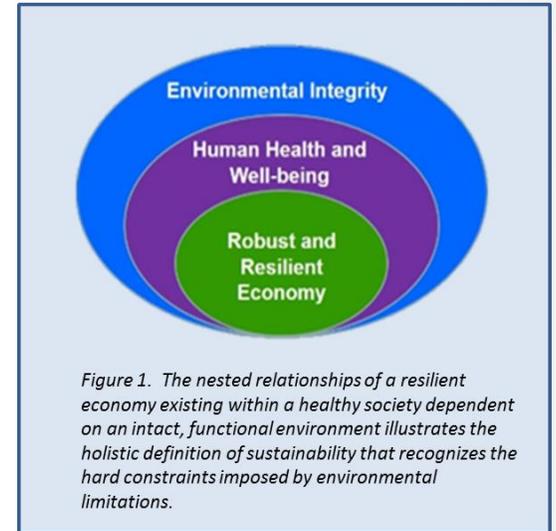


Working Toward a  
Sustainable Future



# SHC Program Vision

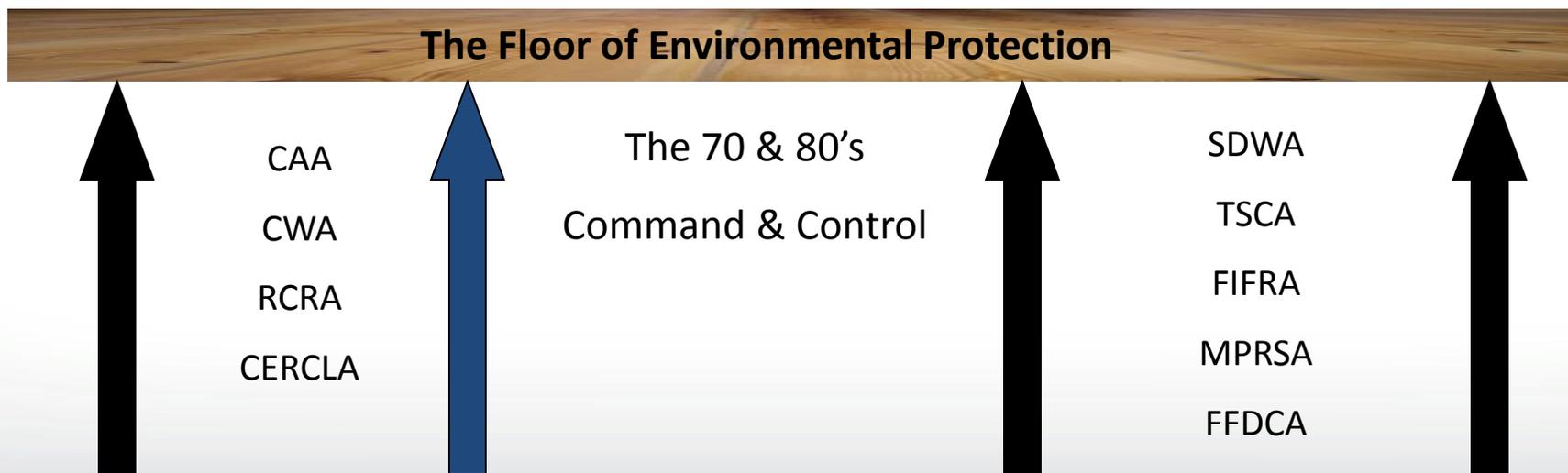
To understand the associations and causal relationships between public health, well-being, and ecosystem services. SHC is developing the underlying research and tools to offer solutions to community-based decision makers within and outside the Agency



## The Ceiling of Environmental Protection

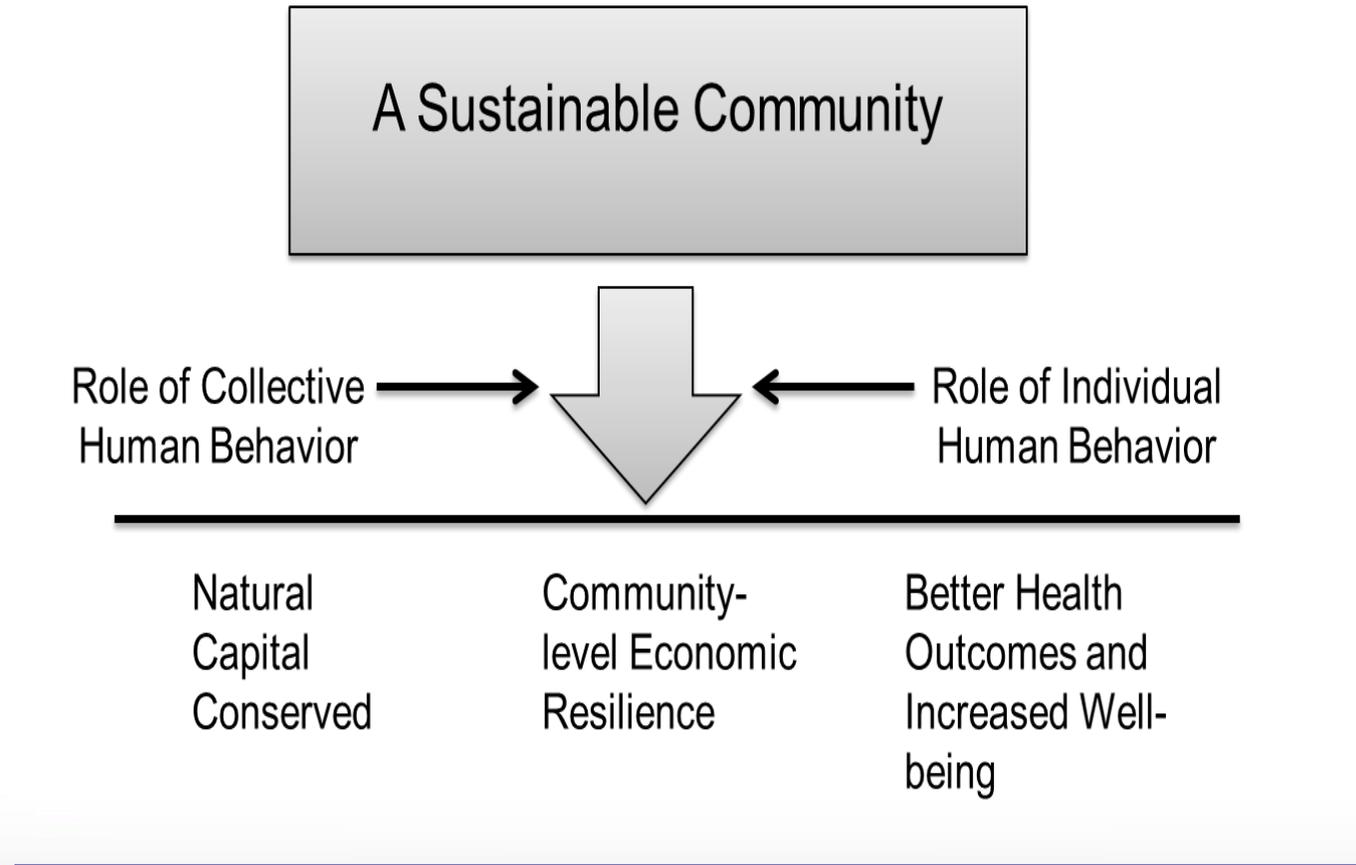
- Traditional approaches have set a “high floor”
- Systems approach necessary for sustainable environmental, economic and social outcomes

SHC research will develop science-based tools, data, and information to support sustainable regulatory and non-regulatory approaches



# Sustainable and Healthy Communities Research Program

*Hypothesis: Community-based decisions using a sustainability paradigm (i.e., a systems approach) will result in positive environmental, social & economic outcomes*



### ***SHC's Perspective on Sustainability***

*The depletion of resources through the tragedy of the commons is an economic theory by Garrett Hardin<sup>1</sup>, and is often cited in connection with sustainable development, meshing economic growth and environmental protection resulting in improved well-being. Commons in this sense has come to mean nature's benefits such as the atmosphere, oceans, rivers, fisheries; i.e., ecosystem goods and services. SHC subscribes to the view of Elinor Ostrom<sup>2</sup> who found the tragedy of the commons not as difficult to solve. She looked at how communities manage common resources, such as fisheries, land, water, air, and identified a number of factors conducive to successful sustainable management. All of these factors tend to operate as a holistic system with appropriate community-based rules and procedures in place with built-in incentives for responsible use and consequences for overuse.*

*SHC's research program is intended to understand the science of sustainable development and to develop tools that allow communities to avert the tragedy of the commons by using these tools to make informed decisions leading to improved well-being.*

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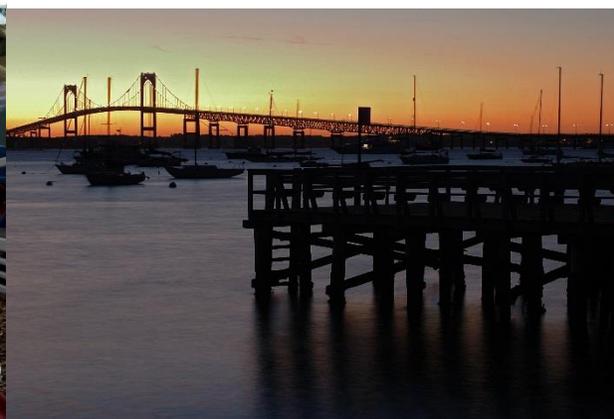
<sup>1</sup> *The Tragedy of the Commons*". *Science* **162** (3859): 1243–1248.

<sup>2</sup> Ostrom, E. (2009). "A General Framework for Analyzing Sustainability of Social-Ecological Systems". *Science* **325** (5939): 419–422.

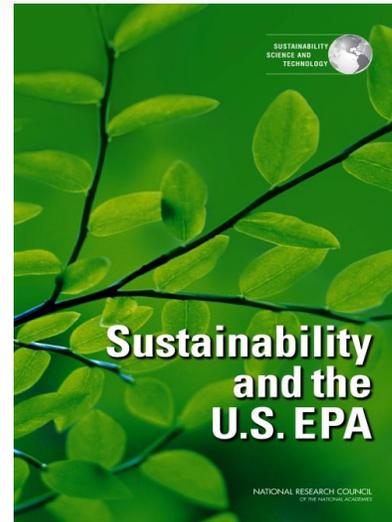


## SHC Priorities

- ✓ Research to help the Agency build sustainability into its day-to-day operations
- ✓ Develop the data, models and tools to expand community stakeholders' capabilities to consider the impacts of decision alternatives
- ✓ Research and technical support for cleaning up communities, ground water, and oil spills, restoring habitats and communities, and advancing sustainable development
- ✓ Development of a Sustainability Assessment and Management Toolbox

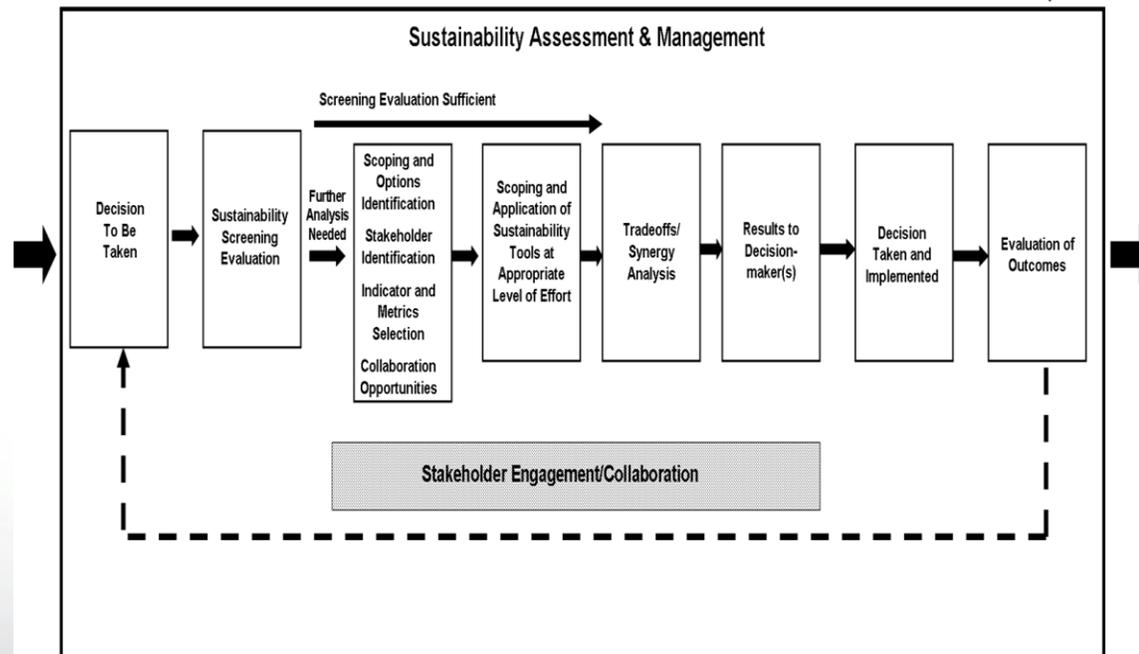


# Integrated Solutions = A Sustainability Assessment Toolbox

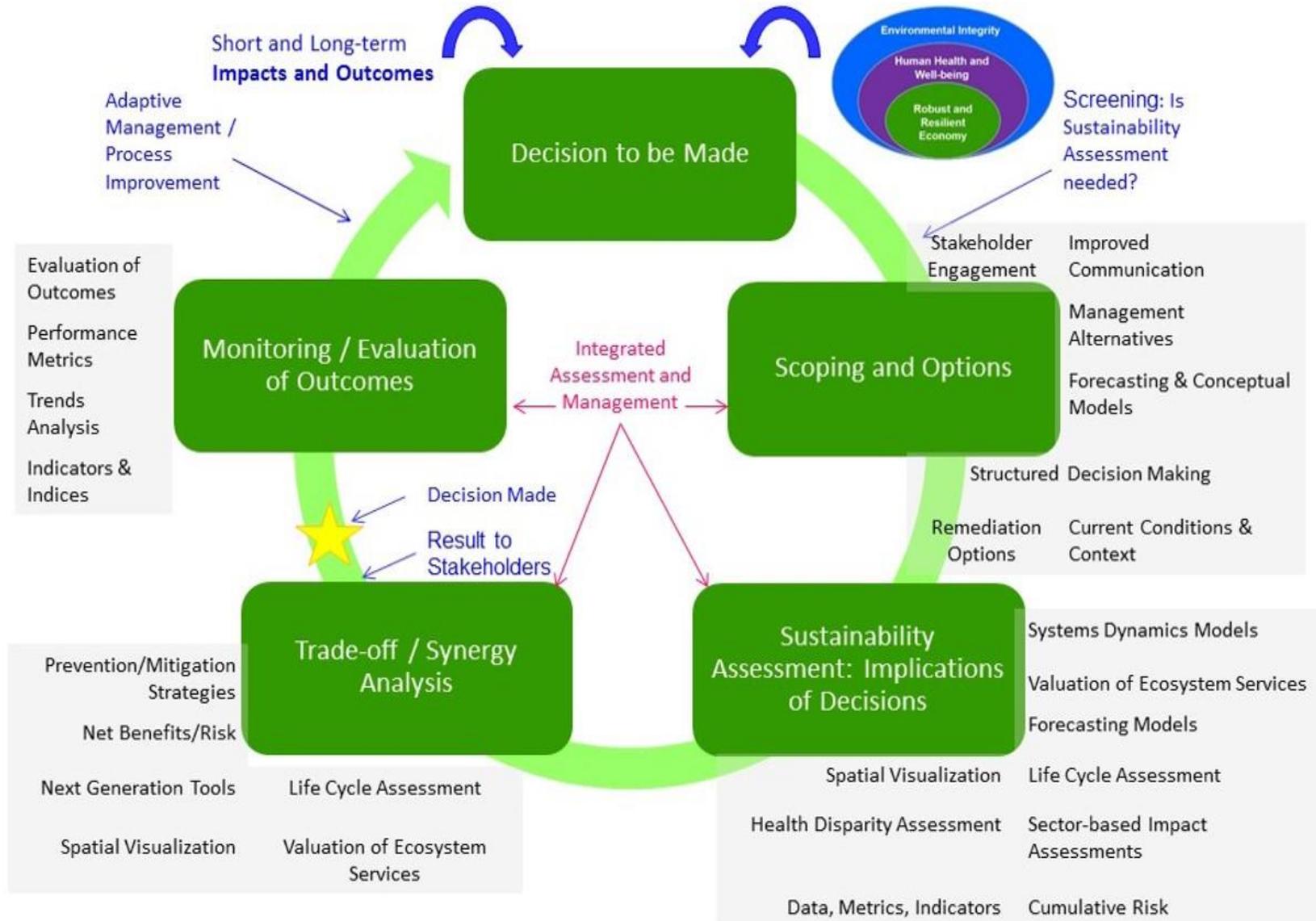


The National Academy of Sciences  
Recommends:

- Sustainability Assessment and Management toolbox
- Analyze consequences of alternative decision options on the full range of social, environmental, and economic indicators
- Show distributional impacts to vulnerable or disadvantaged groups and ecosystems

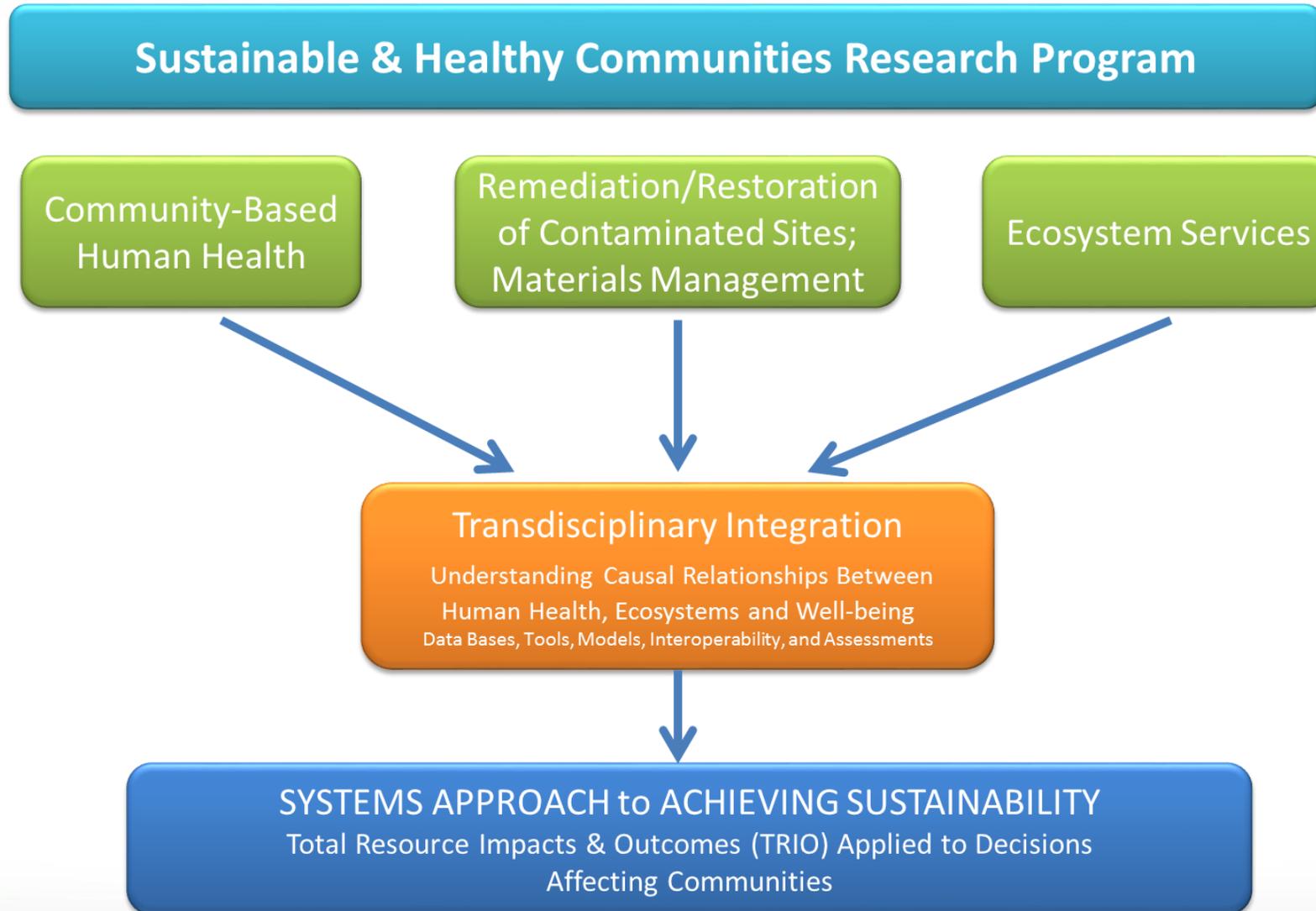


# Sustainability Assessment & Management for Integrated Solutions



# SHC Structure

# Program Design: SHC Builds on ORD's Historic Strengths





# SHC's Research Topics and Project Areas



## Decision Support and Innovation

- 1.61 Decision Science and Support Tools
- 1.62 EnviroAtlas: A Geospatial Analysis Tool
- 1.63 Environmental Workforce and Innovation



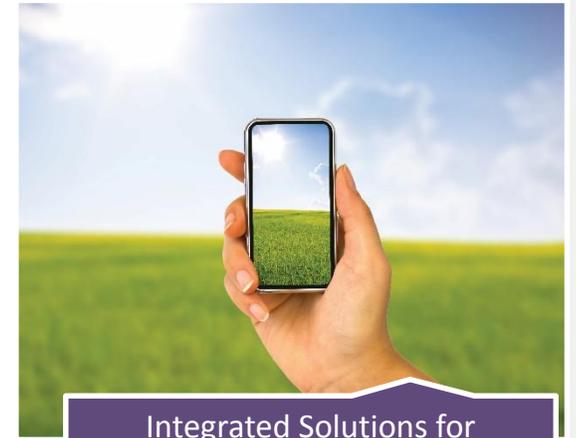
## Community Well-Being

- 2.61 Community-based Ecosystem Goods & Services
- 2.62 Community Public Health & Well-Being
- 2.63 Assessing Health Disparities in Vulnerable Groups
- 2.64 Indicators, Indices, & the Report on the Environment



## Sustainable Approaches for Contaminated Sites and Materials Management

- 3.61 Contaminated Sites
- 3.62 Environmental Releases of Oils and Fuels
- 3.63 Sustainable Materials Management



## Integrated Solutions for Sustainable Communities

- 4.61 Integrated Solutions for Sustainable Communities

## Topic 1: Decision Support & Innovation

Develop tools and approaches to assist community stakeholders in making environmental decisions.

### Project 1.61

#### Decision Science & Support Tools

(a) Decision-focused Design and Use of Tools; (b) Software Re-Configuration; (c) Tool Development, Support & Delivery

### Project 1.62

#### EnviroAtlas: A Geospatial Analysis Tool

(a) Improved Functionality & Case Studies; (b) New Tools & Data Layers; (c) Outreach & Communication

### Project 1.63

#### Environmental Workforce and Innovation

(a) STAR & GRO Fellowships; (b) People, Prosperity, & the Planet (P3) and Small Business Innovation (SBIR)



# FY 2016-2019 Strategic Plan

## Topic 2: Community Well-Being (Public Health and Ecosystems Goods and Services)

Provide research and metrics to predict interactions between natural and built environment to promote individual and community well-being and maintain or restore high environmental quality.

### Project 2.61

#### Community-Based Ecosystem Goods & Services

(a) Classification, Metrics & Production; (b) Benefits; (c) Climate/Stressors; (d) Coordinated Case Studies; (e) Integration, Synthesis & Communication

### Project 2.62

#### Community Public Health & Well-being

(a) Engagement, Assessment Tools & Decision-Support; (b) Enviro Drivers of Community Health & Well-being; (c) Improving Community Health, Well-being, and Exposure Assessments

### Project 2.63

#### Assessing Health Disparities in Vulnerable Groups

(a) Children's Environmental Health; (b) Tribal Communities; (c) Disproportionately Impacted Communities

### Project 2.64

#### Indicators, Indices & the Report on the Environment

(a) State of the Practice for Sustainability Indicators; (b) Development of Indicators of Ecological & Community Resilience; (c) Interpreting Environmental Conditions; (d) Report on the Environment (ROE)



## Topic 3: Sustainable Approaches for Contaminated Sites and Materials Management

Provide science and technical support to assess and manage contaminated sites. Develop science that supports materials reduction, reuse, recycling, and disposal to minimize environmental impacts.

### Project 3.61

#### Contaminated Sites

(a) Technical Support; (b) Site Characterization, Remediation, & Management; (c) Impacts of Contaminated Ground Water

### Project 3.62

#### Environmental Releases of Oils and Fuels

(a) Oil Spills; (b) LUST

### Project 3.63

#### Sustainable Materials Management

(a) Life Cycle Management; (b) Re-use of Organics & Other Materials; (c) Regulatory Support

## Topic 4: Integrated Solutions for Sustainable Communities

Integrated sustainability assessments: Develop tools and research to assist communities in holistically evaluating their decisions so they can optimize economic, societal, ecological, and human health outcomes (while minimizing adverse impacts and costs).

### Project 4.6I

## Integrated Solutions for Sustainable Communities

(a) Sustainability Tool Box; (b) Sustainability Assessment & Management for Communities; (c) Case Studies

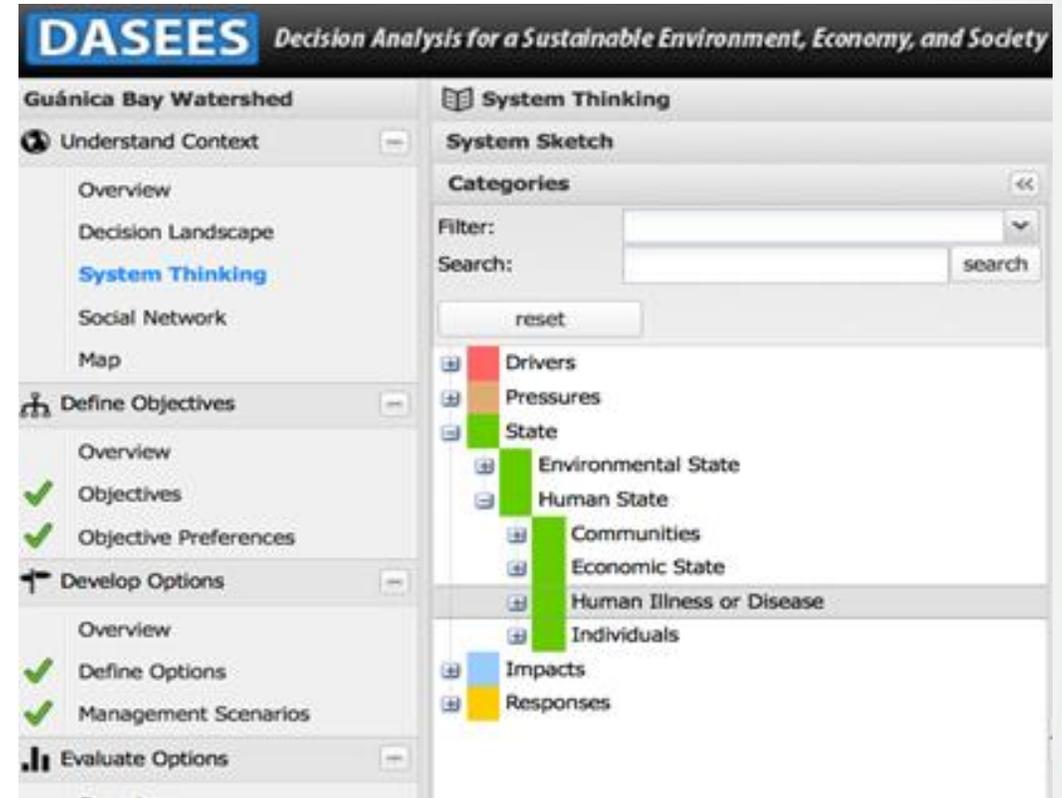
# Representative Products

# Structured Decision-Making

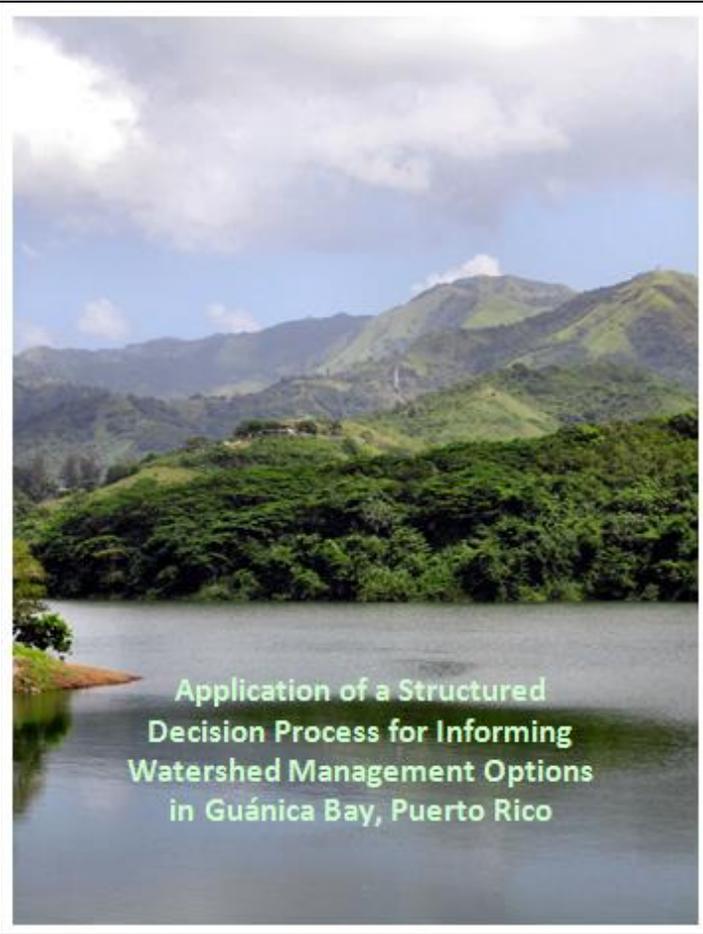
A process to elicit and organize key *stakeholder values* and relevant *scientific knowledge* for making decisions

## DASEES (Decision Analysis for a Sustainable Environment, Economy, and Society)

- a web-based tool supporting community decision-making
- Facilitates the application of Structured Decision Making (SDM) through organizing and processing information used for identifying common goals, and creating, evaluating, and implementing alternatives for complex environmental management and policy problems

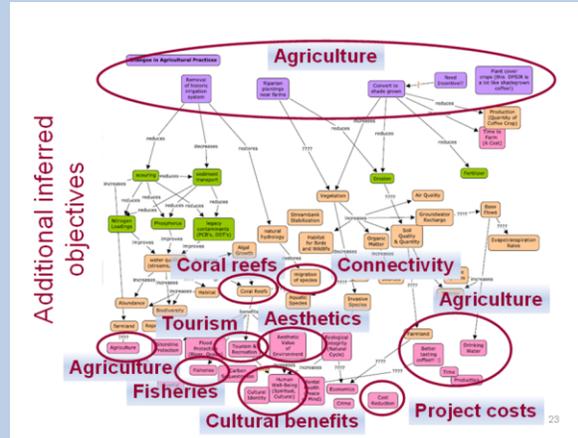


# Guánica Bay, Puerto Rico Watershed Management

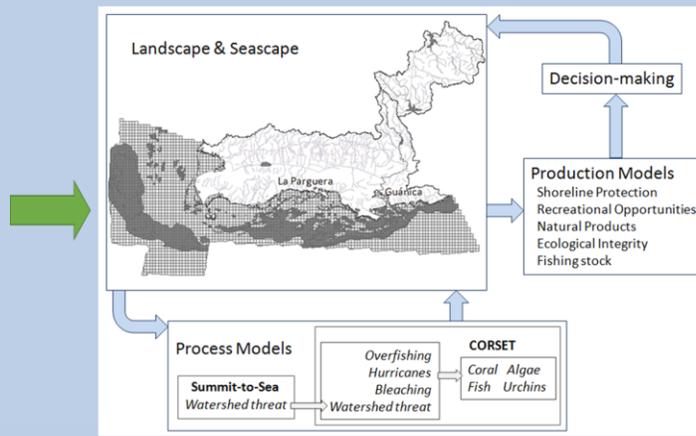


Application of a Structured Decision Process for Informing Watershed Management Options in Guánica Bay, Puerto Rico

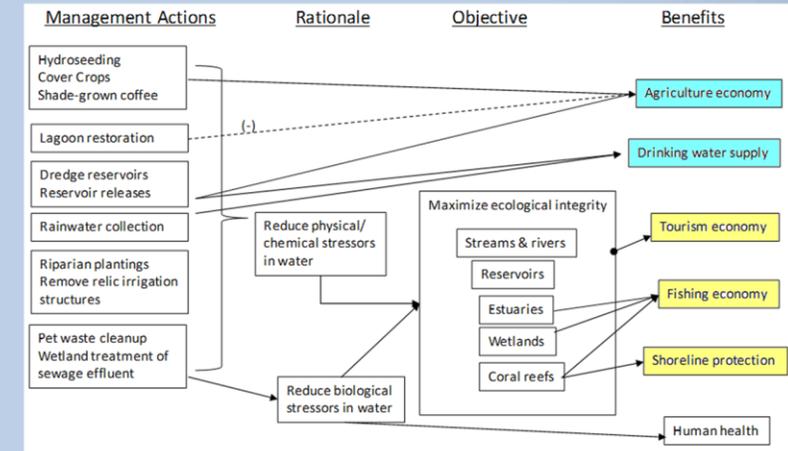
Project 1.61



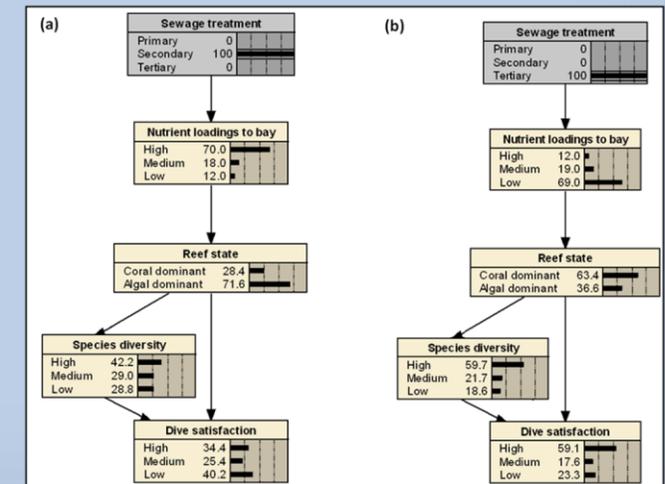
Decision Context – Conceptual Mapping



Scenario Modeling



Objectives, Measures, Management Action



Alternative Evaluation and Trade-offs

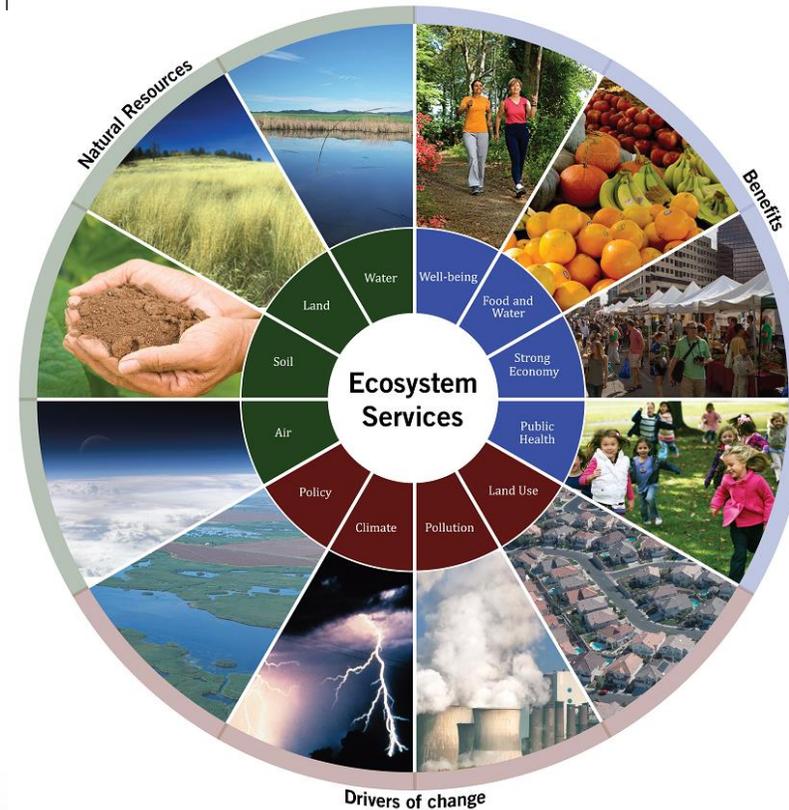
# EnviroAtlas

An online decision support tool giving users the ability to view, analyze, and download geospatial data and other resources; designed to inform decision-making, education, and additional research

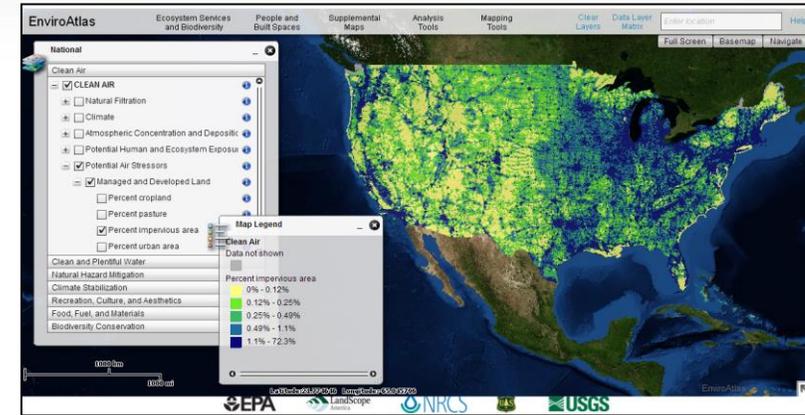
EnviroAtlas includes:

- Geospatial indicators
- Supplemental data (e.g., boundaries, land cover, soils, hydrography, impaired water bodies, wetlands, demographics, roads)
- Analytic and interpretive tools

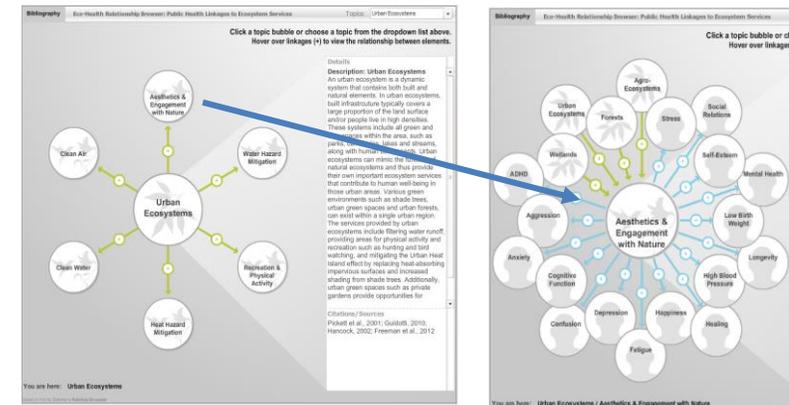
Developed through cooperative effort amongst multiple Federal agencies and other organizations



# EnviroAtlas is a collection of tools and resources



Interactive Mapping Application



Eco-Health Relationship Browser

<http://enviroatlas.epa.gov>

# The Eco-Health Relationship Browser

[http://enviroatlas.epa.gov/enviroatlas/Tools/EcoHealth\\_RelationshipBrowser/introduction.html](http://enviroatlas.epa.gov/enviroatlas/Tools/EcoHealth_RelationshipBrowser/introduction.html)

## 4 ecosystems:

- Forests
- Urban Ecosystems
- Wetlands
- Agro-Ecosystems

## 6 Ecosystem Services:

### *Health promotional services*

- Aesthetics & Engagement with Nature
- Recreation & Physical Activity

### *Buffering services*

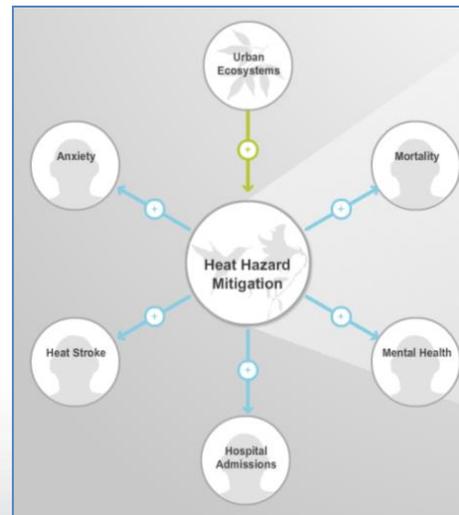
- Clean Air
- Clean Water
- Heat Hazard Mitigation →
- Water Hazard Mitigation

*Incl. extensive bibliography (n ~ 300)*



## 30+ health outcomes:

- Asthma
- ADHD
- Cancers
- Cardiovascular diseases
- Heat stroke
- Healing
- Low birth weight
- Obesity
- Social relations
- Stress
- ... many more



# Environmental Innovation and Sustainable Education

## Grooming the Next Generation of Environmental Scientists and Engineers

- Science to Achieve Results (STAR) Graduate Fellowships (1786 since 1995)
- Greater Research Opportunity - GRO (362 since 1997)



People, Prosperity, Planet (P3)  
Student Sustainability Competition



Small Business  
Innovation  
Research (SBIR)

# Final Ecosystem Goods and Services

“components of nature, directly enjoyed, consumed, or used to yield human well-being” (Boyd & Banzhaf 2007)

Environmental Class + Beneficiary → FEGS



Estuaries and Near Shore Marine



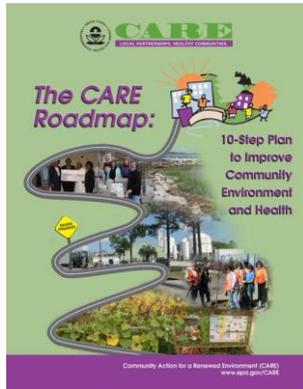
Recreational Food Pickers and Gatherers



Flora and fauna, such as mussels, seaweed, crabs, etc.

# Decision Support Tools for Communities

**C-FERST** is a web-based “tool-kit” to help communities learn more about environmental health issues, gather information, and develop options



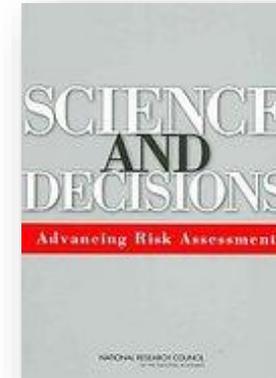
guidance, local exposures and risks, best practices, potential solutions



user-friendly interface, GIS maps, community reports



- Includes step-by-step guidance to inform community-based assessments
- Addresses challenges and needs identified by NRC, NEJAC, others
- Provides a venue for communicating science; EPA recommendations and options to address issues



# Health Impact Assessment



- National community of practice
- SHC
  - Strengthen the overall rigor of HIA practice
  - Advance the use of HIA at higher decision-making levels

HIA Core Values

Democracy • Equity • Sustainability  
 • Ethical Use of Evidence •  
 Comprehensive Approach to Health

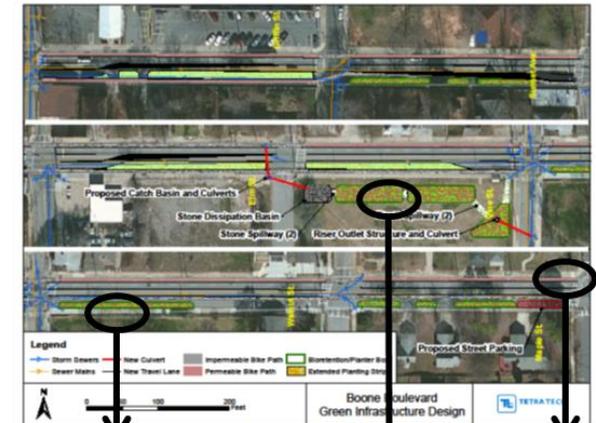
## Issues Facing the Community:

- Pervasive flooding
- Impaired water quality
- Poverty
- Derelict properties
- Aging infrastructure



## Potential Solution:

### Boone Boulevard Green Street Project



Planter box  
 Bioretention cell  
 Permeable pavement

# Social Determinants of Environmental Health: Complementary animal and population-based approaches

Complementary animal and human approaches show how:

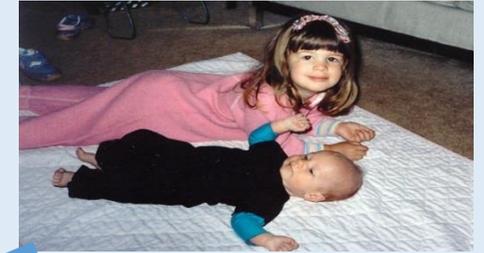
- Prenatal and early life environments impact children's growth, development, health, and future well-being as adults;
- Community stressors impact both individual and community resilience and well-being.

## Factor Interactions & Lifecourse Impacts



**Healthy Food**

Air Quality  
Chemicals



**Clean home & school**

Poverty  
Stress



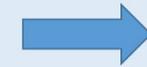
**Exercise**



*Associations*



*Biological Plausibility*



*Causation*

### Animal Studies:

Reliable methods were developed and used to measure key health outcomes in rodent models, These experimental approaches will now be used to evaluate causation and attribution of risk for multiple stressors

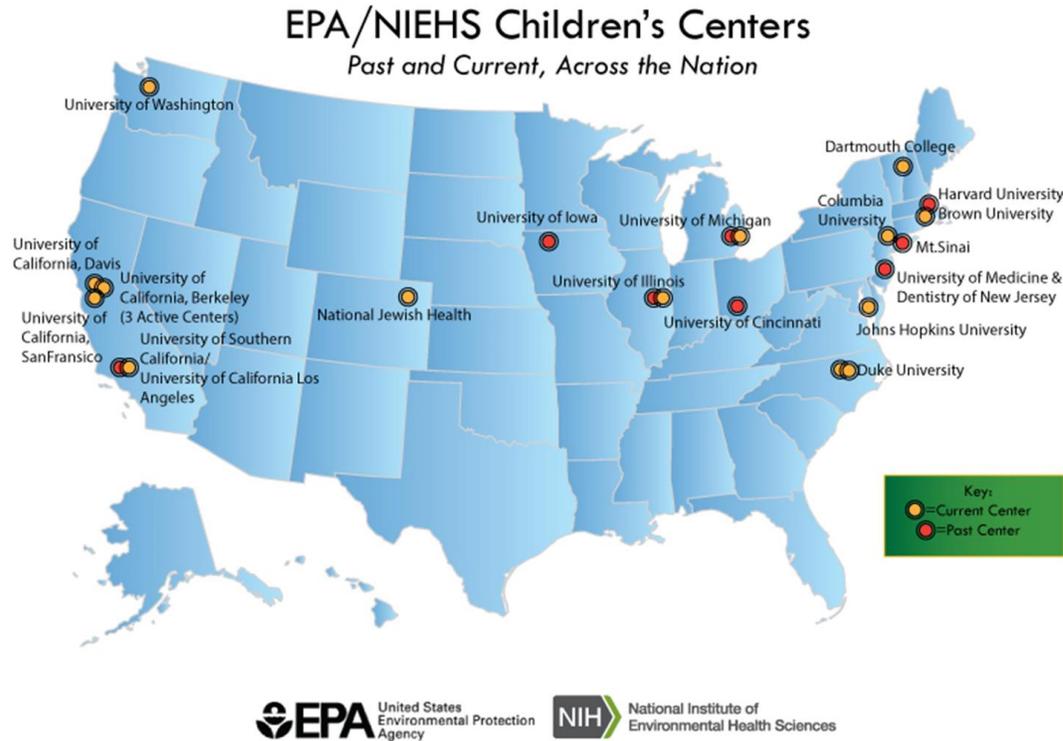
### Population-based studies:

Exposure to air pollution from wildfires was shown to have a greater impact on health in lower SES communities based on the frequency of emergency room visits for asthma and cardiovascular incidents.

# Science to Achieve Results (STAR) Grants

RFA Titles	Periods of Performance
Healthy Schools: Environmental Factors, Children's Health & Performance, & Sustainable Building Practices	FY 2015-2019
Science for Sustainable and Healthy Tribes	FY 2015-2019
Issues in Tribal Environmental Research and Health Promotion: Novel Approaches for Assessing and Managing Cumulative Risks and Impacts of Global Climate Change	FY 2008 -2012
Lifestyle and Cultural Practices of Tribal Populations and Risks from Toxic Substances in the Environment	FY 2003- 2006
Understanding the Role of Nonchemical Stressors & Developing Analytic Methods for Cumulative Risk Assessments	FY 2011-2014
Exploring Linkages Between Health Outcomes and Environmental Hazards, Exposures, and Interventions for Public Health Tracking and Risk Management	FY 2010 -2013
Development of Environmental Health Outcomes Indicators (2006 & 2007)	FY 2007-2010; FY 2008 -2011

# Centers for Children’s Environmental Health



- Asthma and allergy
- Adverse impacts linked to exposure to flame retardants
- Environment and Autism
- Health and safety of whole family – agricultural workers and vulnerable groups

## Intended End Users

### Research Community

- e.g., Dartmouth College Children's Center

### Decision Makers

- Federal, State and local (e.g., FDA arsenic and rice studies)

### General Public



### Los Angeles Times

Proximity to freeways increases autism risk, study finds

*More research is needed, but the report suggests air pollution could be a factor.*

December 16, 2010 | By Shari Roan, Los Angeles Times

Children born to mothers who live close to freeways have twice the risk of autism, researchers reported Thursday. The study, its authors say, adds to evidence suggesting that certain environmental exposures could play a role in causing the disorder in some children.

"This study isn't saying exposure to air pollution or exposure to traffic causes autism," said Heather Volk, lead author of the paper and a researcher at the Saban Research Institute of Children's Hospital Los Angeles. "But it could be one of the factors that are contributing to its increase."



# Recipients of EPA-NIMHD Centers of Excellence on Environment and Health Disparities Research

## Institutions

Weill Cornell Medical College, Cornell University

University of Illinois at Chicago

University of Kansas Medical Center

University of Michigan - Ann Arbor, Drexel University, Jackson State University

Georgia State University

University of South Carolina at Columbia, University of Maryland

Meharry Medical College, Charles Drew University of Medicine & Science, National Space Science and Technology Center, Tulane University of Louisiana, University of Maryland - Baltimore, University of Tennessee - Knoxville

Columbia University Medical Center

University of New Mexico Health Sciences Center

The University of Texas at El Paso, The University of Texas Health Science Center Houston

# Environmental Quality Index

## Multiple Environments



## Multiple Environmental Benefits and Hazards



### Public Access To EQI

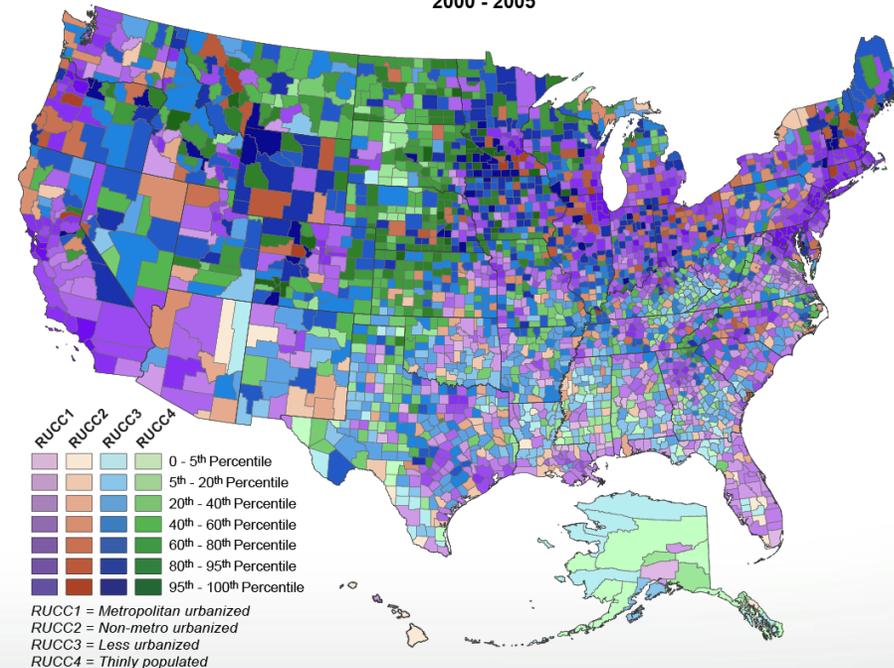
<http://epa.maps.arcgis.com/home/item.html?id=90ab3f8d668c4a4e88144d586ea34141>

<https://edg.epa.gov/data/Public/ORD/NHEERL/EQI>

### Goals:

- To construct an environmental quality index (EQI) for all counties in the U.S. taking into account:
  - multiple domains that influence exposure and health
    - five domains: air, water, land, built environment, and socio-demographic
  - incorporates data representing the chemical, natural and built environment
- Developed to explore associations with adverse health effects

Overall Environmental Quality Index Stratified by Rural Urban Continuum Codes by County 2000 - 2005





# Report on the Environment (ROE)

ROE is now an online, interactive website

The screenshot shows the EPA's Report on the Environment (ROE) website. At the top, there is a navigation bar with links for 'LEARN THE ISSUES', 'SCIENCE & TECHNOLOGY', 'LAWS & REGULATIONS', and 'ABOUT EPA'. Below this is a search bar and a 'Contact Us' link. The main heading is 'EPA's Report on the Environment (ROE)'. A multi-colored navigation bar allows users to explore themes: Air, Water, Land, Human Exposure and Health, and Ecological Condition. A featured indicator section highlights 'U.S. and Global Temperature and Precipitation' with a map of the United States showing temperature trends. A 'ROE Quick Finder' section provides links to 'About the ROE', 'Frequent Questions', and 'Regional and State Trends'. A 'What is the ROE?' section explains the report's purpose. At the bottom, a 'Theme' navigation bar lists categories like Air, Water, Land, Human Health, and Ecological Condition, each with sub-topics. A 'Question' bar and an 'Indicator' bar are also present. A footer note states: '85 indicators respond to questions and show observed trends'.

Exhibit 1. Wet sulfate ( $\text{SO}_4^{2-}$ ) deposition in the contiguous U.S., 1989–1991 and 2011–2013

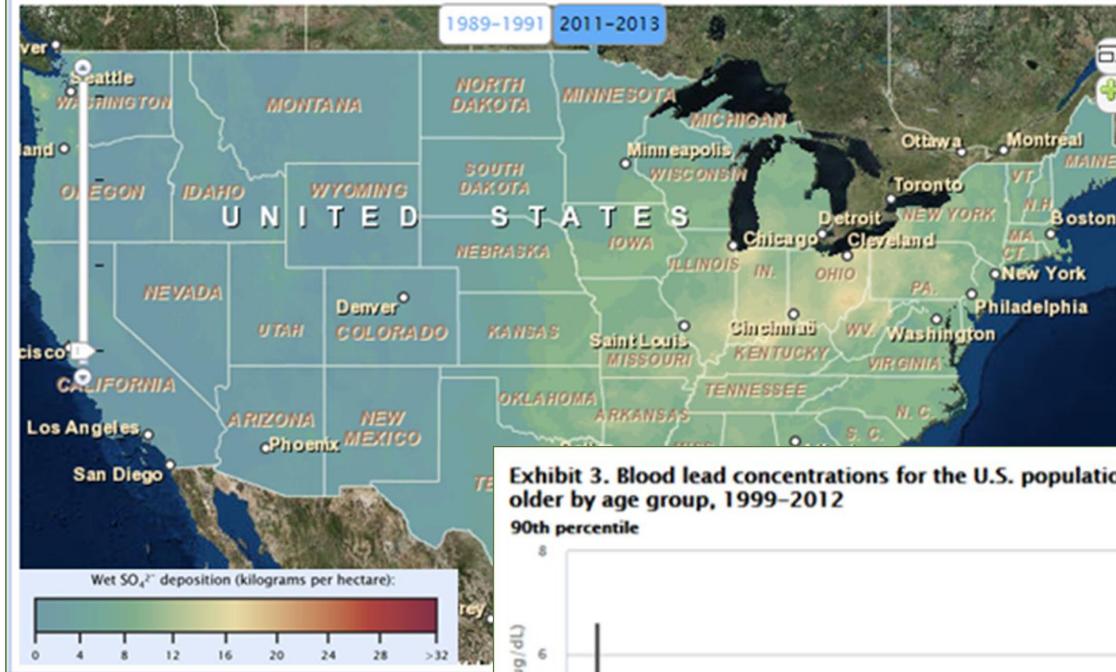
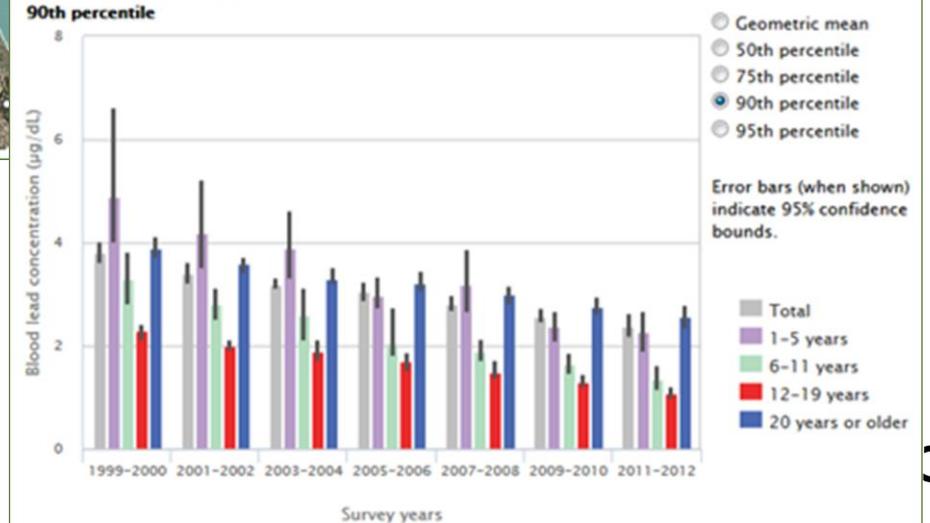
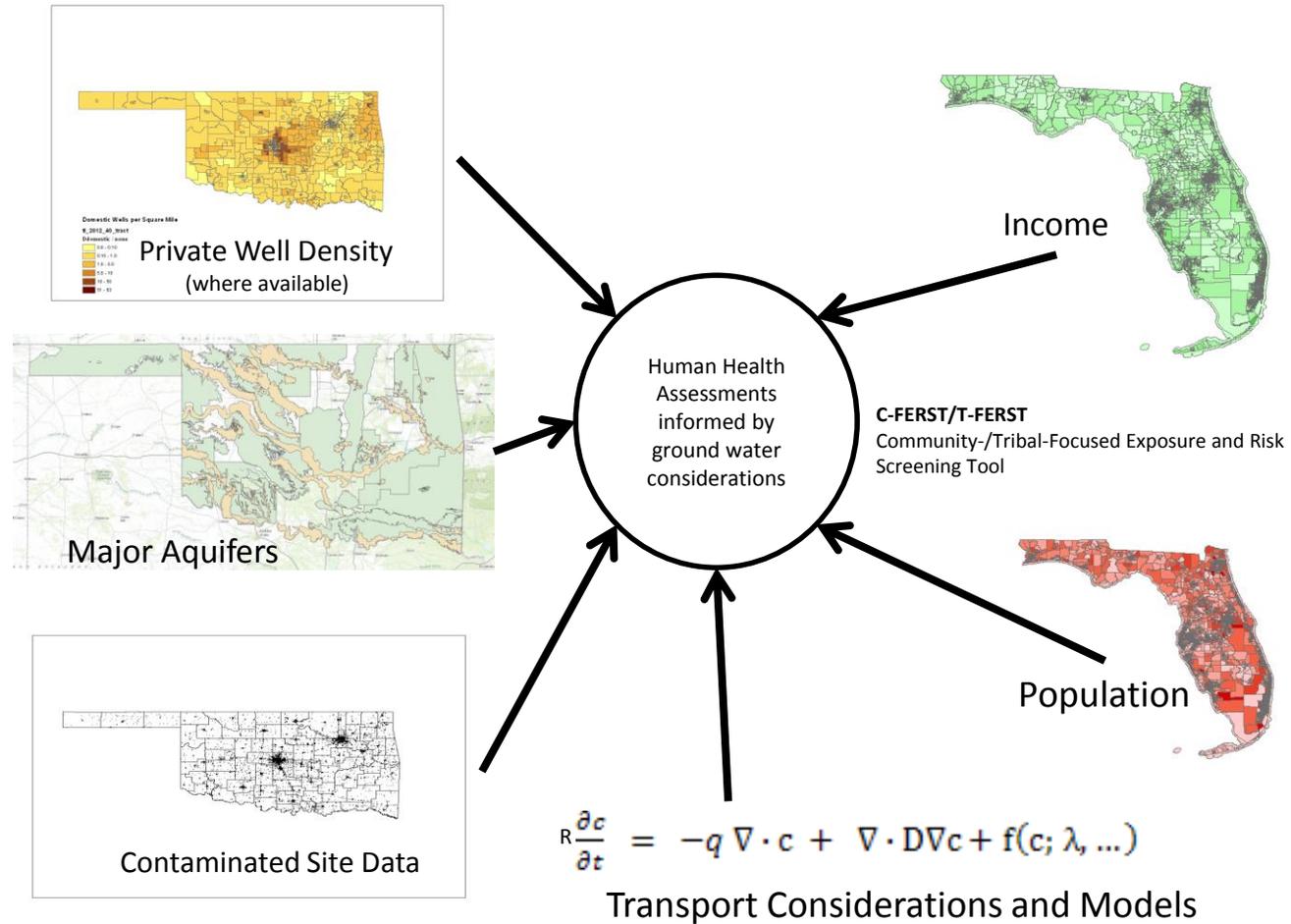


Exhibit 3. Blood lead concentrations for the U.S. population age 1 year and older by age group, 1999–2012



Project 2.64

# Temporal/Spatial Impacts of Ground Water Decisions on Public Health

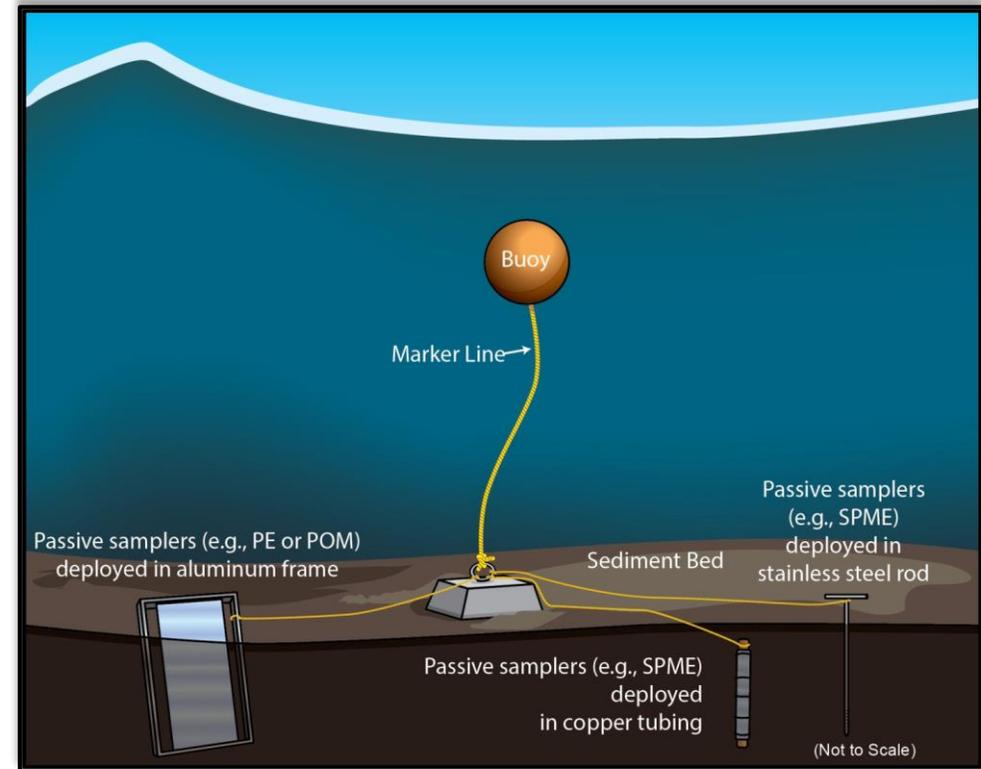


# Passive Sampling for Contaminants in Waters & Sediments

Passive sampling is a tool for sampling the bioavailable concentrations of contaminants of concern in waters and sediments

Passive sampling is a scientifically-robust, cost-effective and logistically-simpler tool compared to conventional sampling methods

This research provides guidance to Superfund Remedial Project Managers (RPMs), States and Tribes for using passive sampling to make scientifically informed decisions at their sites



# Bioreactor Landfills

- Bioreactor landfill operation accelerate the short-term landfill gas (LFG) generation rate, which increases opportunities for economically viable and beneficial utilization of methane in renewable energy options
- Bioreactor research and development has contributed to a notable reduction in methane emissions



# Beneficial Use of Industrial Materials in Roadways and Structural Fill Emplacements



Reference: U.S. EPA, Report on Potential Risks Associated with the Use of Chat from the Tri-State Mining Area in Transportation Projects. RTI project 0208860.003.020

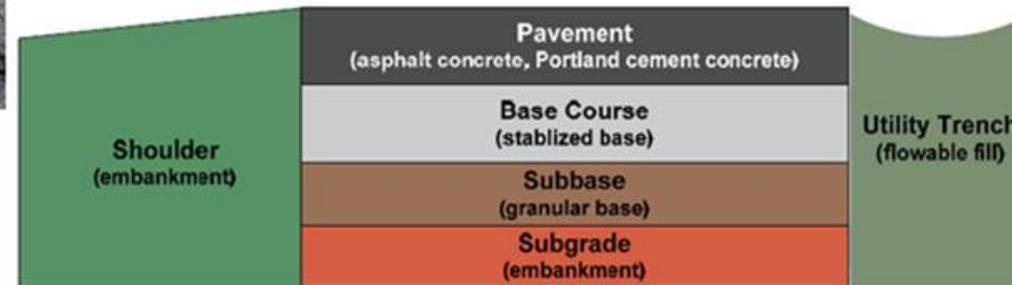
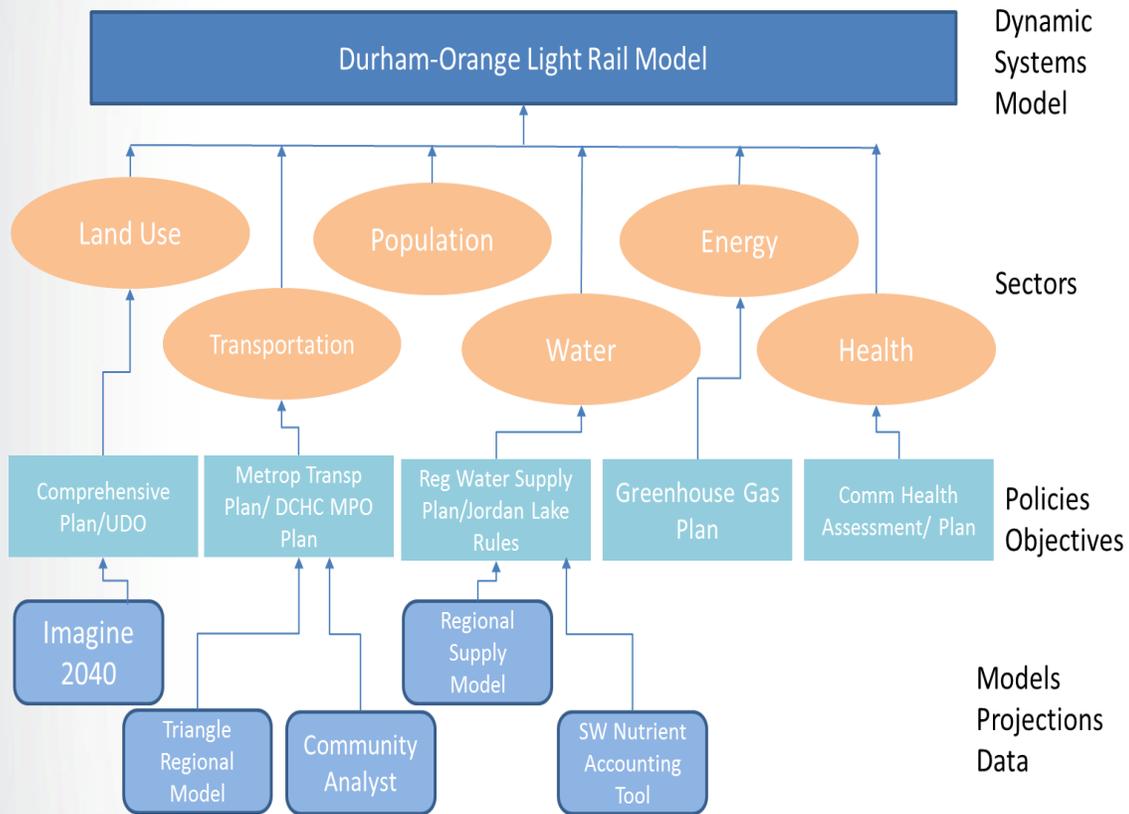


Figure 3-1. Cross section of typical road illustrating engineered layers.

## RIMM Problem: Hazardous Material Reuse in Roadway Construction

# Systems Approach to Assessing the Durham Light Rail Project



The dynamic systems model (DSM) is a tool that integrates actions and policies from multiple sectors with knowledge about their interactions and feedbacks to achieve greater net benefits. Consistent with the goals of Federal Partnership for Sustainable Communities, the Durham Light Rail seeks to increase mobility, decrease VMT and air emissions, while providing affordable housing, increasing public health and safety, enhancing economic development, improving water quality and resources, reaching vulnerable and underserved populations, and creating an overall improved sense of “place.”



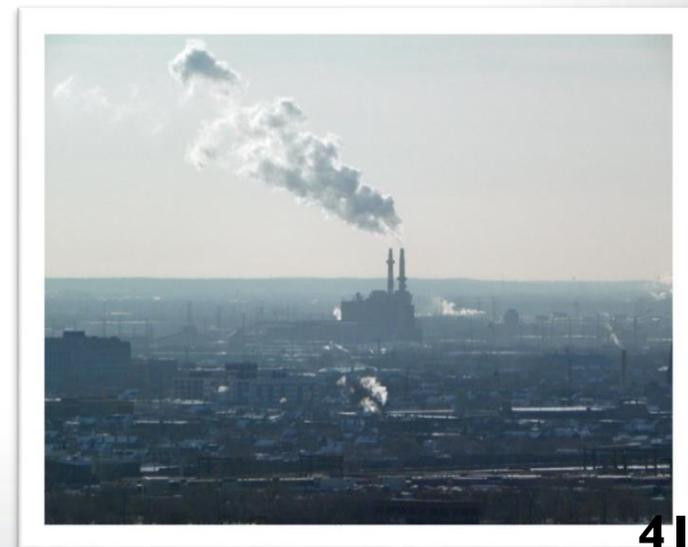
# The Green Infrastructure Wizard [GIWiz]

- GIWiz is an EPA Internet Web Application that quickly and simply connects users with EPA's tools and resources related to Green Infrastructure.
- It is a collaborative, cross-agency, priority project led by OP, ORD, and OW, with help from EPA regions and program offices.
- The Web Application accesses a database of Green Infrastructure tools and resources (TARs) that are available currently on EPA's various internet sites.
- GIWiz has two primary functions to access Green Infrastructure information: 'Quick Links,' and 'Explore.'
  - The Quick Links function allows users to very quickly access information with two clicks. They first click one of four areas: 'Learn,' 'Research,' 'Design,' or 'Assess,' then click a subarea, and receive a dynamic table of tools and resources.
  - The Explore function allows users to pick and choose areas of interest from a set of Green Infrastructure categories that narrows the dynamic results table to their specific needs.



## **SHC collaborates with all of ORD's research programs on cross-cutting issues, for example**

- Children's Environmental Health – Co-funding with NIEHS of Children's Environmental Health Research Centers
- Nitrogen and Co-pollutants – 9 SHC research products in FY14 addressing nutrient pollution
- Climate Change – Developing sustainable community responses to climate change
- Environmental Justice – Community-based pilot studies using tools such as EnviroAtlas and approaches to cumulative assessment



ORD Roadmap	SHC Topic Area			
	Decision Support and Innovation	Community Well-Being: Public Health and Ecosystem Goods & Services	Contaminated Sites and Material Management	Integrated Solutions for Sustainable Outcomes
Climate Change	✓	✓ ✓	✓	✓
<b>Environmental Justice</b>	✓	✓ ✓	✓	✓
Children's Health		✓ ✓		
Nitrogen & Co-Pollutants	✓	✓		✓ ✓

# Relationships

# Examples of SHC's Regional Interactions

## Regions 9 and 10

- Modeling of lead exposure risk for enforcement targeting and risk prioritization
- Tribal research and training on proper function conditioning, a qualitative evaluation approach to ecosystem services remediation for non-point source pollution and restoration of degraded lands.
- Assessment and in situ reduction of lead bioavailability
- C-FERST: Community engagement in contaminated community

## Region 5

- Cumulative assessments in overburdened communities
- Great Lakes: Remediation of contaminated sediments and restoration of habitats

## Region 1

- Community and tribal assessment and decision support
- Health impact assessment for urban built environment

## Region 2

- Health impact assessment training to aid Hurricane Sandy recovery
- Citizen science for air monitoring (collaboration with ACE)
- Integrated ecoservices in Guanica Bay, PR

## Regions 6, 7, 8

- Net Zero projects for water and energy sustainability at Ft Riley, KS and Ft Carson, CO
- EnviroAtlas tribal coverage
- Green Infrastructure to mitigate heat island effects

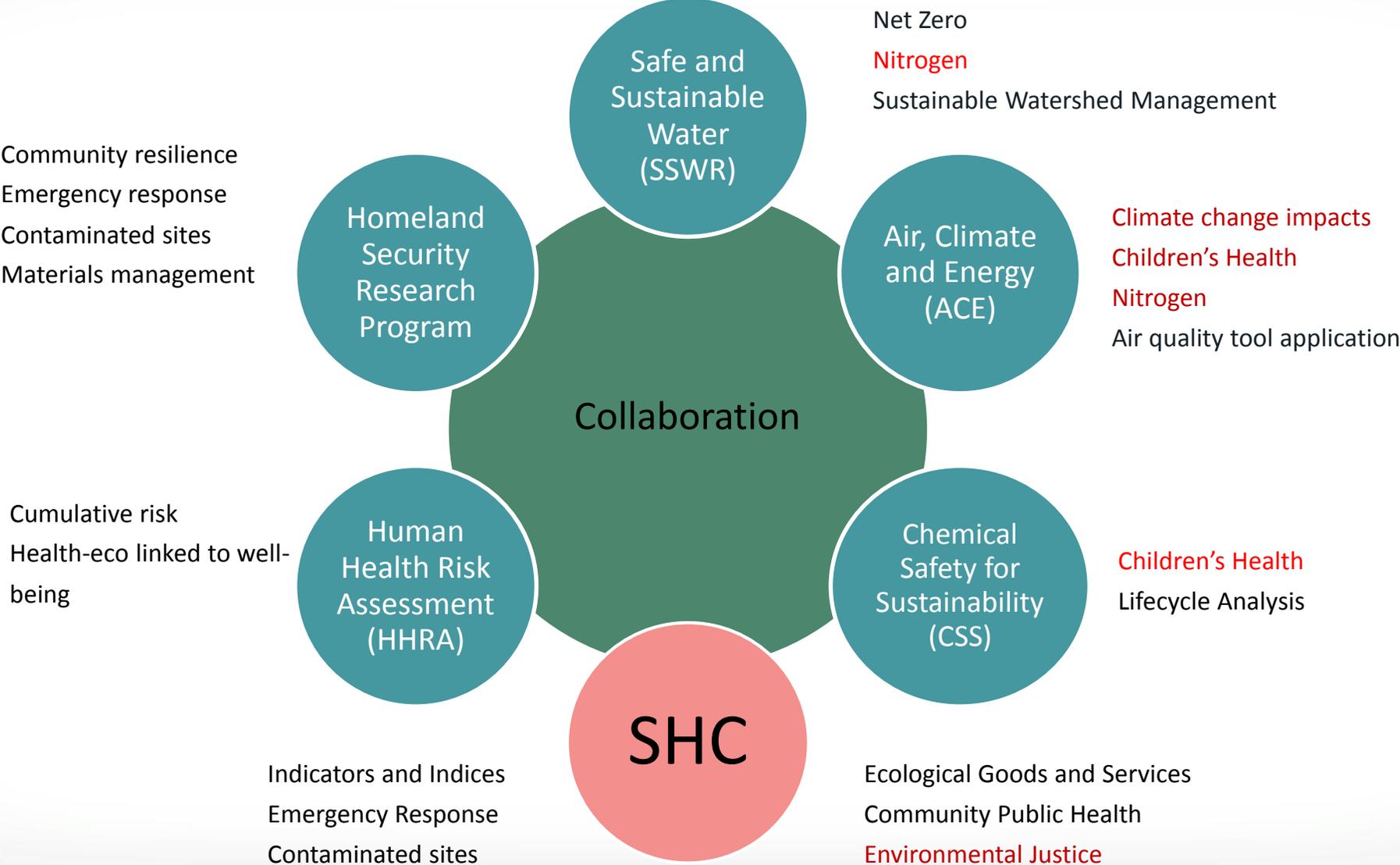
## Region 3

- Multi-criteria Integrated Resource assessment for Chesapeake Bay and mountaintop mining

## Region 4

- Durham: Integrated transportation planning
- Atlanta: Proctor Creek Health Impact Assessment
- Tampa Bay Land Use scenario analysis

# SHC Interactions





# Opportunities for Communication

## Webinars

- SHC Monthly Seminar Series
- Scientific presentations at monthly partner meetings
- Scientific presentations at monthly SHC team meetings

## Engagement in Research Planning

- Program and Regional Office input in:
  - Strategic Research Action Plan
  - Project Charters

## Newsletter

- Bi-monthly Science Matters e-newsletter highlights ORD research

## Annual Communique

- Highlight research and direction (in person and via webinar)
- 260 attendees, including 140 from program offices and regions
  - OSWER: OBLR, OEM, ORCR, OSRTI, OUST, IOAA, other
  - All 10 Regions, OAR, OP (OCHP, OSC), OW

## Workgroups and Meetings (examples)

- OSWER: Community engagement, OUST, Contaminated ground water
- Regional Science Liaisons
- OAR: OAQPS, ORIA
- OSC
- Community Facilitation Team
- Quarterly meetings with OSWER AA
- Monthly Call for All Partners, includes “science moment”
- Monthly Call with SHC Implementation Team

# Budget



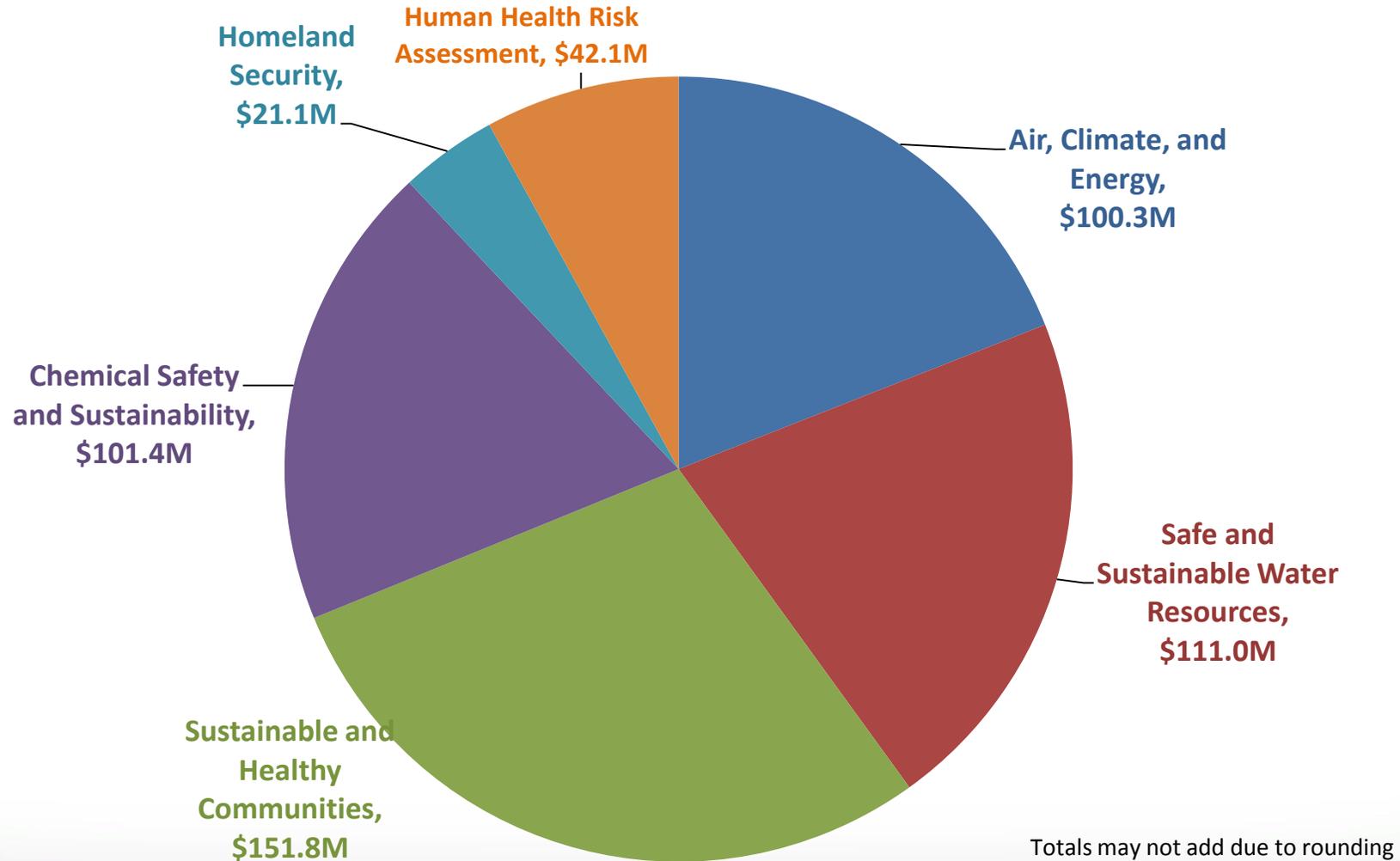
# FY15 Operation Plan

Appropriation	FY 2015	FY 2015
	Planning (\$k)	Op Plan (\$k) <sup>1</sup>
Science & Technology	\$43,918	\$149,975
Fellowships	\$9,346	
STAR Grants	\$10,528	
SBIR	\$4,474	
People, Prosperity, Planet (P3)	\$1,607	
Inland Oil Spill Programs	\$517	\$664
Leaking Underground Storage Tanks	\$62	\$320
Hazardous Substance Superfund	\$1,094	\$14,032
<b>Total Budget Authority / Obligations</b>	<b>\$45,591</b>	<b>\$164,991</b>
<b>Total Workyears</b>	<b>332.4</b>	<b>503.5</b>

<sup>1</sup> Op Plan levels include personnel costs and benefits (PC&B)



# ORD's FY 2016 Budget by Research Program Projects



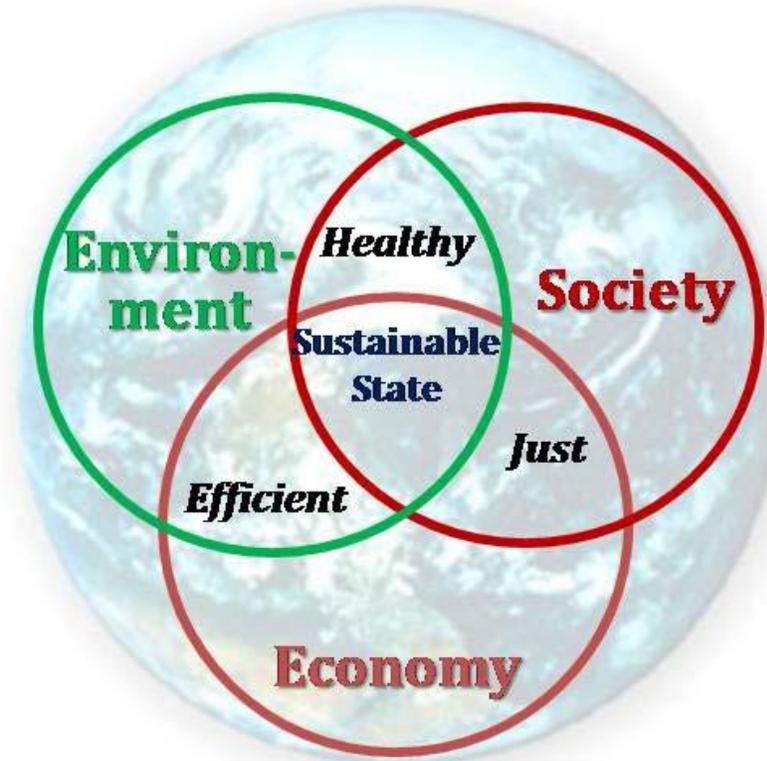
# General Charge Questions

- *Question 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?
- *Question 2.* How effective are the approaches for involving the EPA partners in the problem formulation stage of research planning?
- *Question 3.* How well does the program respond to the needs of EPA partners (program office and regional).

# SHC-Specific Charge Questions

- *Question 1.* SHC has committed to integrating ecological and human health to better address issues of human and community well-being. Does the research program contain the elements necessary to integrate these two critical elements of EPA's mission?
- *Question 2.* SHC's portfolio includes both hypothesis-driven research and the development of decision-support tools to aid Agency, state, and community stakeholders. Is the balance of research and tool development appropriate for this program?
- *Question 3.* SHC has a mission to address the short-term needs of EPA's Office of Solid Waste & Emergency Response for research on contaminated sites, oil and fuel spills, and sustainable materials management. How can SHC best leverage these short-term research goals with longer term community sustainability and environmental justice goals?

# THANK YOU



# Background Slides

## ORD “101”



# Aligning Research with EPA Strategic Goals

## Cross-Agency Strategies

- Sustainable Future
- Visible Difference in Communities
- New Era of Partnerships
- High-Performing Organization

## EPA Goals 2014-2018

- Addressing Climate Change and Improving Air Quality
- Protecting America's Waters
- Cleaning Up Communities and Advancing Sustainable Development
- Ensuring the Safety of Chemicals and Preventing Pollution
- Enforcing Laws, Ensuring Compliance

## Research Programs

- Air, Climate & Energy
- Safe and Sustainable Water Resources
- Sustainable and Healthy Communities
- Chemical Safety for Sustainability
- Human Health Risk Assessment
- Homeland Security

- **What is a Strategic Research Action Plan (StRAP)?**
  - Describes our research program for internal and external audiences
  - Serves as our guide for resource planning activities
  - First generation covered 2012-2016
  - Currently completing 2<sup>nd</sup> generation to over FY16-19 (final release October 1, 2015)
  - Developed in consultation with advisors (Science Advisory Board and Board of Scientific Counselors), EPA partner offices, other stakeholders

**Air, Climate & Energy**



**Sustainable & Healthy Communities**



**Safe & Sustainable Water Resources**



**Chemical Safety for Sustainability**



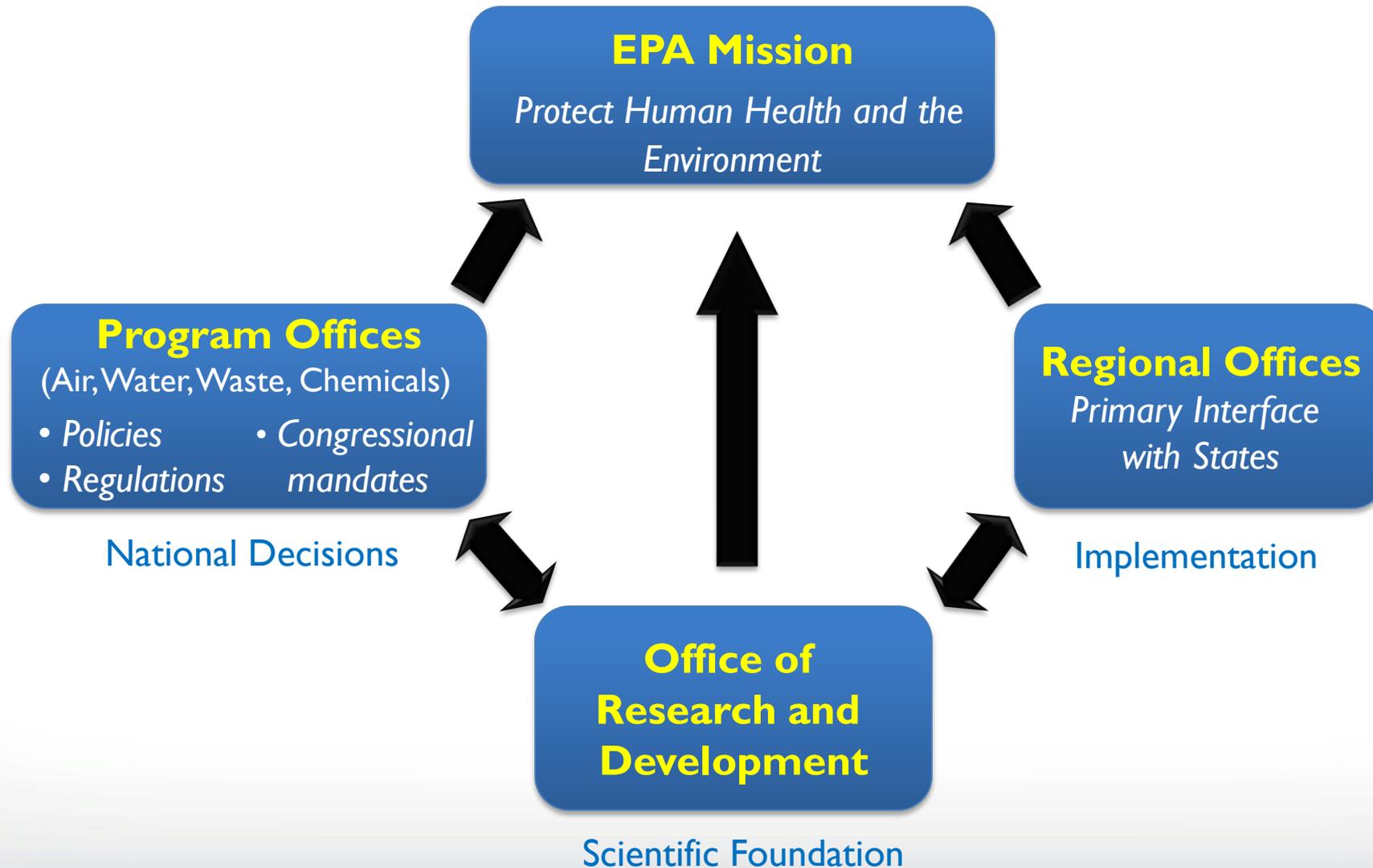
**Human Health Risk Assessment**



**Homeland Security**

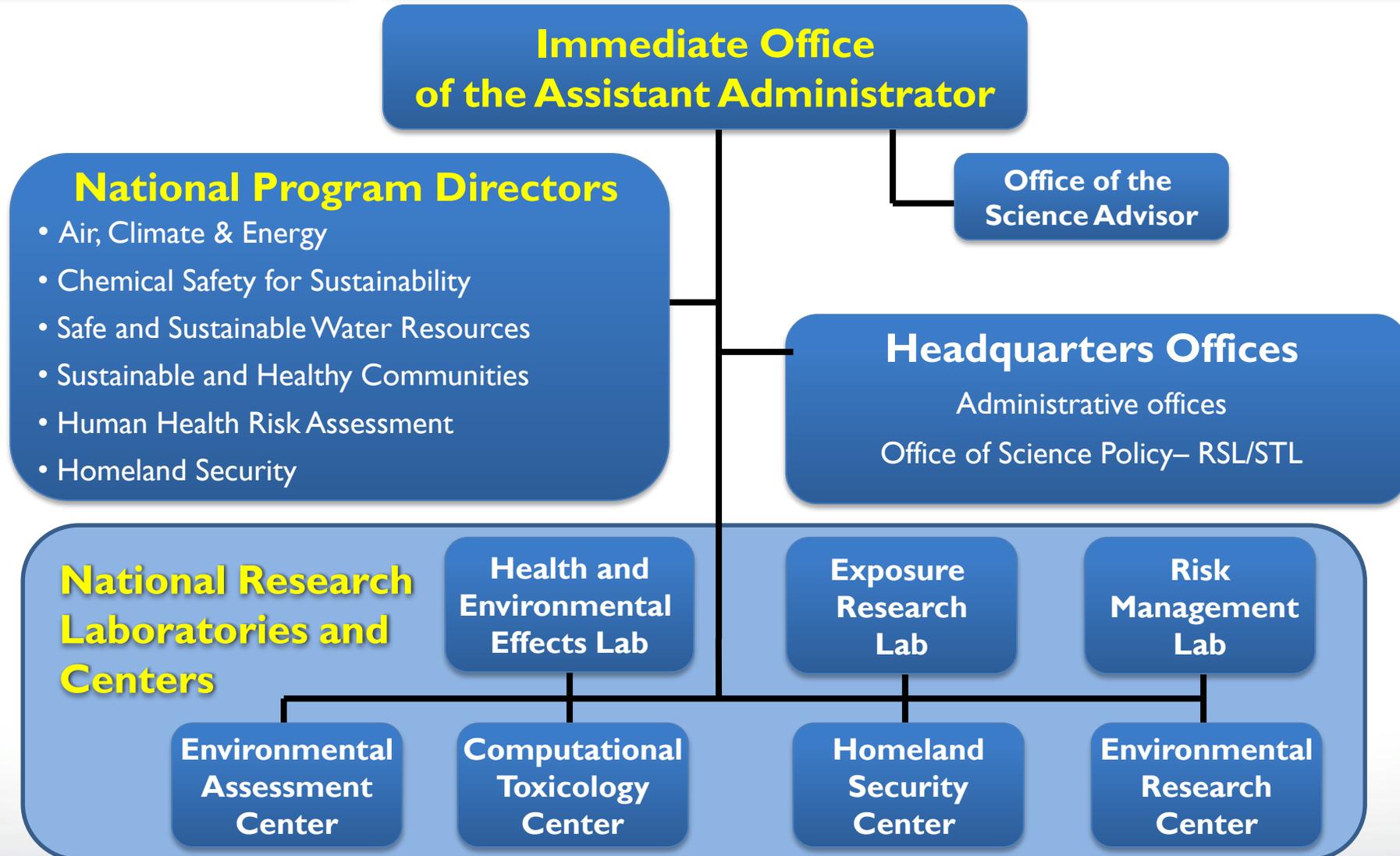


# Science to Support EPA's Mission

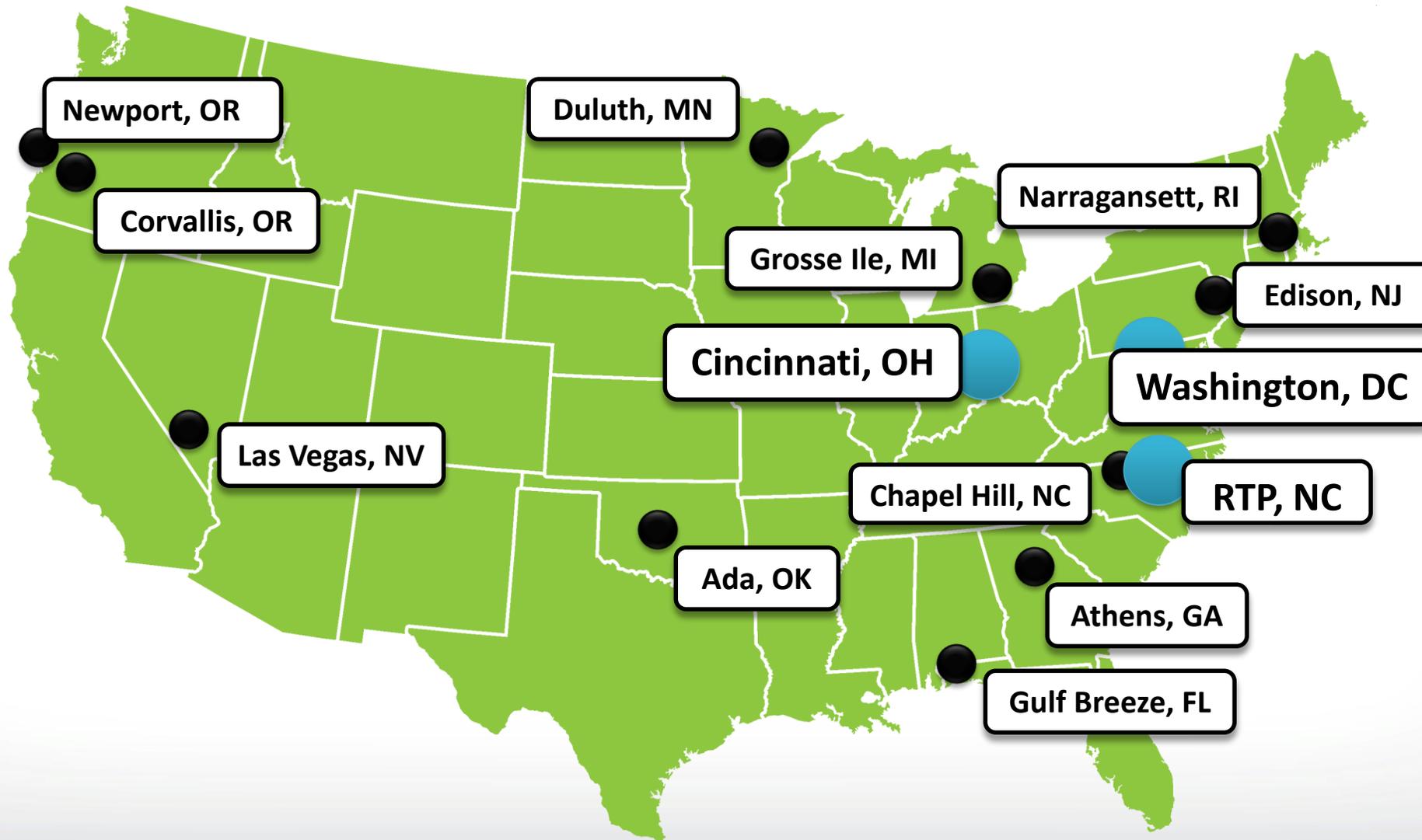




# ORD Organizational Chart



# ORD Research Facilities





# EPA Research Grants to Universities

 *STAR Research Grants by State*

