



Introduction to EnviroAtlas

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October 18, 2021



EnviroAtlas is an online resource providing geospatial data, easy-to-use tools, and other resources related to ecosystem services, their chemical and non-chemical stressors, connections to human health, and equity.

EnviroAtlas Includes:

- Over 500 map layers, environmental and demographic
- **Interactive Mapping Application**
- **Eco-Health Relationship Browser**
- Analytic and Interpretive Tools
- GIS Toolboxes

EnviroAtlas Interactive Map

Find address or place

Selected Community: Combined Communities

448 of 448 Maps Expand Hide Icons

Carbon Storage
Crop Productivity
Ecosystem Markets
Energy Potential
Engagement with Outdoors
Health and Economic Outcomes
Land Cover: Near-Water
Land Cover: Type
Landscape Pattern
Near-Road Environments
Pollutant Reduction: Air
Pollutant Reduction: Water
Protected Lands
Species: At-Risk and Priority
Species: Other
Water Supply, Runoff, and Flow
Water Use
Weather and Climate
Wetlands and Lowlands
EPA Regulated Facilities
Impaired Waters
Pollutants: Nutrients
Pollutants: Other
Quality of Life
Commuting and Walkability
Employment
Housing and Schools
Population Distribution
Vacancy
Ecological Boundaries
Hydrologic Features
Political Boundaries

EnviroAtlas Flagship tools

Aesthetics & Engagement with Nature

Agro-Ecosystems
Urban Ecosystems
Forests
Wetlands
Vulnerable Populations
Stress
Social & Community Ties
Self-Esteem
Respiratory Symptoms
Obesity
Mental Health
Low Birth Weight
High Blood Pressure
Happiness
Healing
Fatigue
Confusion
Cognitive Function
Depression
Anxiety
Aggression
COPD
Cancer
Cardiovascular Diseases

EnviroAtlas data and resources can be used in a range of projects, from regional to local scales. The examples provided here are meant to introduce some EnviroAtlas datasets and tools and demonstrate how they might be used in various contexts. [If you have used EnviroAtlas resources, or have an idea for an example use or case study, we'd love to hear from you!](#)

EnviroAtlas
people health nature economy
www.epa.gov/enviroatlas

Acres of Land Enrolled in the Conservation Reserve Program (CRP)

This EnviroAtlas national map depicts the acres of land within each 12-digit hydrologic unit (HUC) enrolled in the US Department of Agriculture's (USDA) Conservation Reserve Program (CRP). The CRP, established in 1985, is administered by the USDA Farm Service Agency. Farmers enrolled in the program receive annual rent payments and establishment cost share to remove environmentally sensitive land from crop production and plant environmentally beneficial perennial species.



Why is the Conservation Reserve Program important?

Farmers may voluntarily enroll marginal farmland in the CRP for 10 to 15 years. Environmentally sensitive or marginal farmland includes stream or lake riparian areas, periodically saturated or flooded lowland, or soils subject to wind or water erosion. Depending on the character of the candidate farmland, the CRP offers a number of initiatives with management practices tailored to wetland and riparian areas, duck and upland bird habitat, wildlife enhancement, retention of highly erodible soils, or honeybee and native pollinator habitat.

Farmland returned to natural cover may provide a number of ecosystem services that represent a long term investment in increased agro-ecosystem productivity. Natural land cover on sensitive areas helps protect water quality and terrestrial and aquatic habitat. Natural grassland and woodland slow stormwater runoff, filter pollutants from the air and soil, recharge groundwater, moderate air and water temperatures, and sequester carbon to mitigate global warming. A recent Farm Service Agency study reported that exports of sediment and nutrients fell to 0 after marginal cropland was planted with CRP natural cover.¹ By FSA estimates, CRP is responsible for a reduction of 450 million tons of erosion annually. Targeting the most highly erodible cropland could further increase the retention of erodible soils.² Another study on the high plains Ogallala aquifer in Oklahoma found that CRP parcels significantly increased groundwater recharge in areas where irrigation had reduced groundwater supplies.³

CRP acreage, particularly native pollinators such as bees, butterflies provide a critical service in ecosystems. About 75% of all crop and domesticated (honeybee) pollinators.⁴ The lack of local

pollinators can result in lost crop productivity. Recent declines in honeybee populations make the services provided by wild pollinators even more critical to maintaining stable crop yields.⁴ Native pollinators require blooming plants throughout the growing season and nesting habitat in tree cavities or abandoned insect or rodent nests.⁵

CRP acreage is important in the Prairie Pothole region of the Northern Great Plains to maintain and restore duck breeding habitat. Results from a study evaluating the nesting success of 5 duck species during 1992-1997 in CRP vs. non-CRP acres estimated an additional 12.4 million recruits to the fall migration attributed to improved CRP habitat.⁶

CRP enrollment is affected by factors such as farm bill enrollment caps, high commodity crop prices, and regional rental rates. The most recent 2014 farm bill reduced annual enrollment to a cap of 24 million acres in 2018, a reduction from a high enrollment of 37 million acres in 2007.⁷ High crop prices and early opt-out provisions raise concerns that more CRP acreage may be returned to agricultural uses.

How can I use this information?

This map identifies the number of acres of agricultural lands within a 12-digit HUC that are enrolled in the CRP. The map can be used to compare CRP acres that may be in need of set may be compared with other datasets such as National Wetland Inventory floodplains to analyze how agricultural lands relate to wetland ecosystem services.

Use Cases

EnviroAtlas Examples



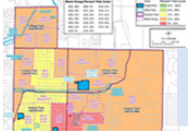
Prioritizing Tree Planting in Durham, NC

- This example shows how a planner might use EnviroAtlas to prioritize the planting of additional trees to benefit children in the vicinity of Durham, NC. [Story Map, 2015]
- This story highlights how EPA researchers ultimately helped the City of Durham analyze and prioritize tree plantings in their neighborhoods. [Webpage, 2019]



Using EnviroAtlas to Identify Locations for Urban Heat Island Abatement

Excessive heat can be dangerous to human health. Vegetation and trees can help reduce urban heat island. This example explores one solution for minimizing the negative impacts of excessive summer heat due to urbanization in Portland, OR. [PDF, 2017]



Using EnviroAtlas in a Health Impact Assessment (HIA)

IA is whether to adopt a and organizations to es in county parks. [PDF,

EnviroAtlas - Accessing a National Dataset

Search All Layers

427 of 427 Maps

Carbon Storage
Crop Productivity
Ecosystem Markets
Energy Potential
Engagement with Outdoors
Health and Economic Outcomes
Land Cover: Near Water
Land Cover: Type
Landscape Pattern
Near-Road Environments
Pollutant Reduction: Air
Pollutant Reduction: Water
Protected Lands
Species At Risk and Priority

Common bird species in steep decline
Modified 01, 02, 03 species
Modified IUCN threatened terrestrial vertebrate species
Modified Partners in Amphibian and Reptile Conservation (PARC) species
Modified Partners in Flight Watch List bird species
Modified State of the Birds species of conservation concern
Modified threatened and endangered vertebrate species

Watch on YouTube

EPA
United States Environmental Protection Agency

EPA/600/RR-15/128

Health Impact Assessment (HIA) & EnviroAtlas

Integrating Ecosystem Services in Making Process

Guides

Office of Research and Development
National Exposure Research Laboratory

Data and tools are not enough

Educational materials

K - 6

Exploring Your Watershed

4 - 6

Introduction to Ecosystem Services

4 - 12+

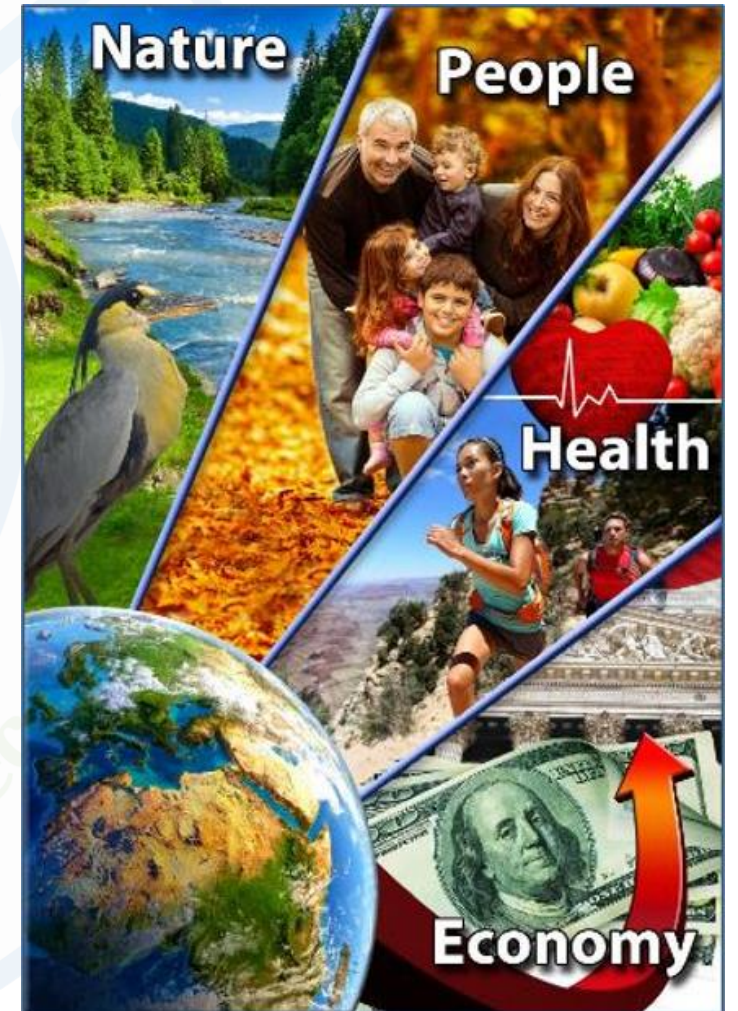
Connecting Ecosystems and Human Health

9 - 12+

Building a Greenway Case Study

EnviroAtlas Objectives

- Conduct research to produce data and tools linking nature, people, health, and the economy
- Publish that research in the science literature
- Integrate those products with other relevant data in an accessible application and website
- Reach a broad audience, including decision-makers, academia, and educators
- Increase geospatial intelligence



Clean Air



**Clean &
Plentiful
Water**



**Biodiversity
Conservation**



**Food, Fuel,
&
Materials**



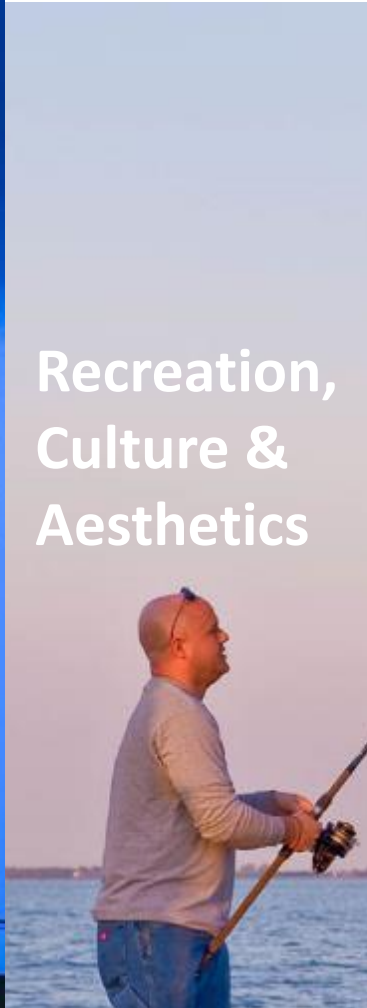
**Natural
Hazard
Mitigation**



**Climate
Stabilization**

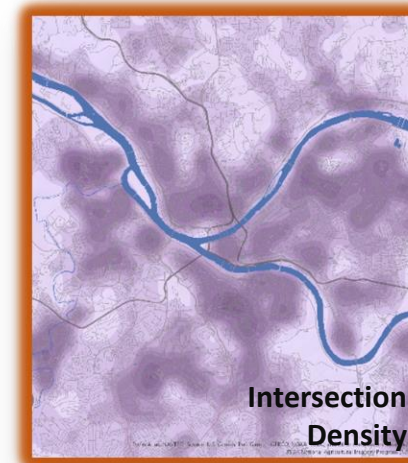
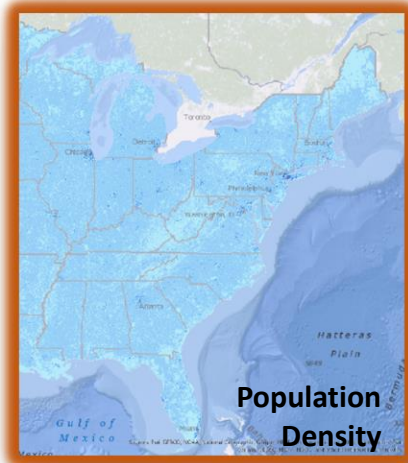
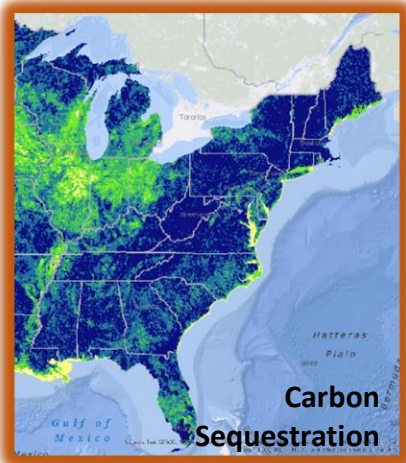


**Recreation,
Culture &
Aesthetics**



Ecosystem Services Benefit Categories





National Data

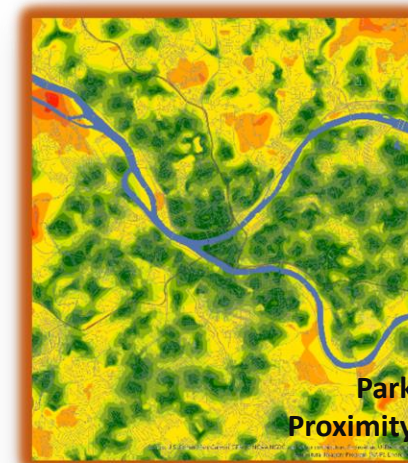
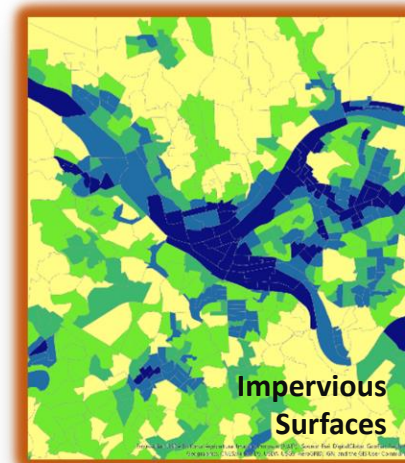
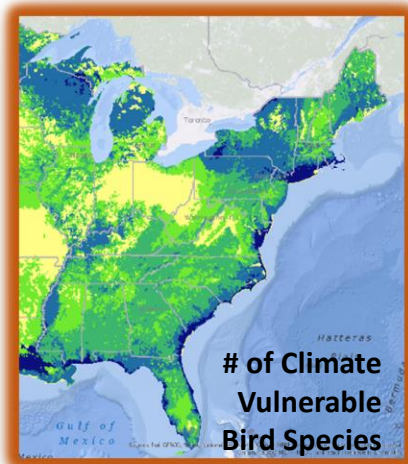
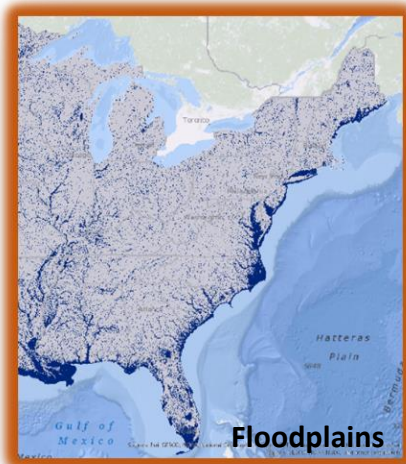
30-meter land cover
 400+ unique data layers
 Consistent data for the
 conterminous U.S.

EnviroAtlas

Data Fact Sheets
 Peer-reviewed
 Standard Metadata
 Open access

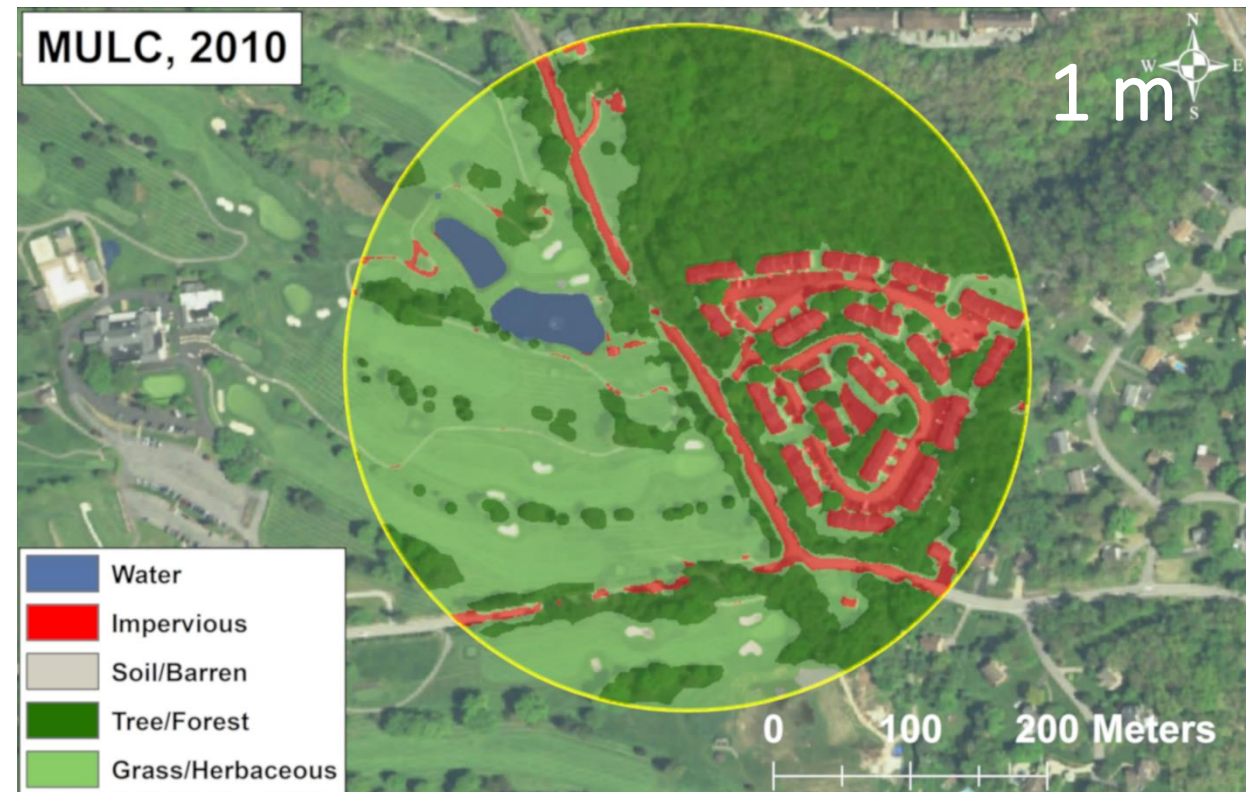
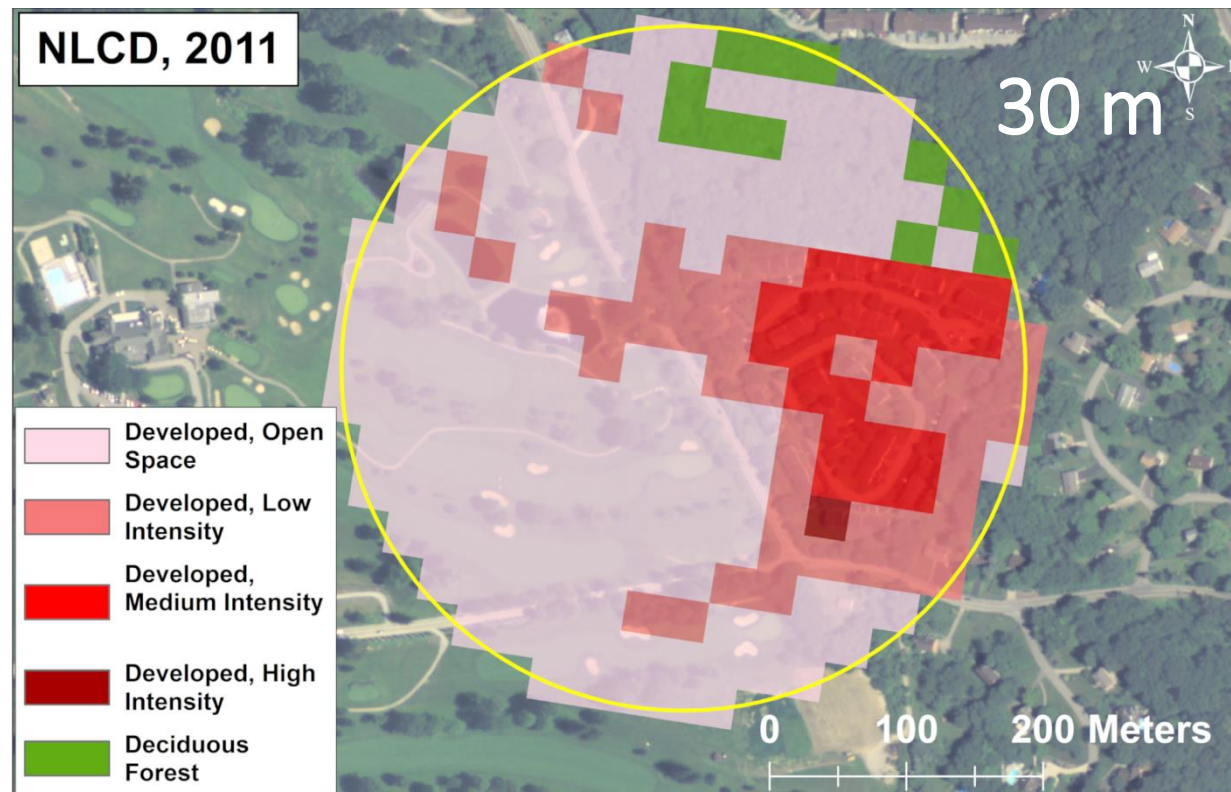
Community Data

1-meter land cover
 100+ unique data layers
 30 metropolitan areas
 1450 cities & towns (65+ million people)



Land cover

Pittsburgh, PA



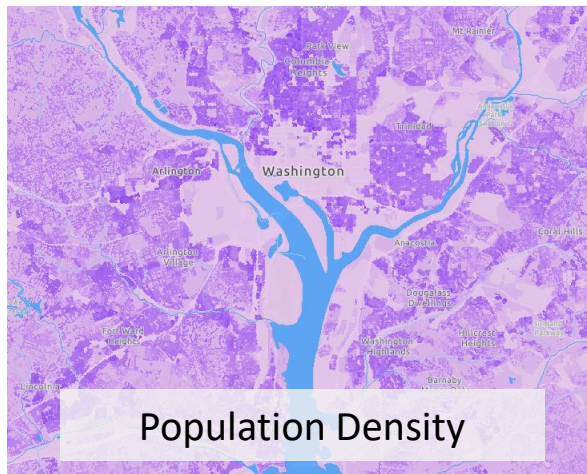
Data in EnviroAtlas

- EnviroAtlas provides data at multiple extents and scales

Types of Data

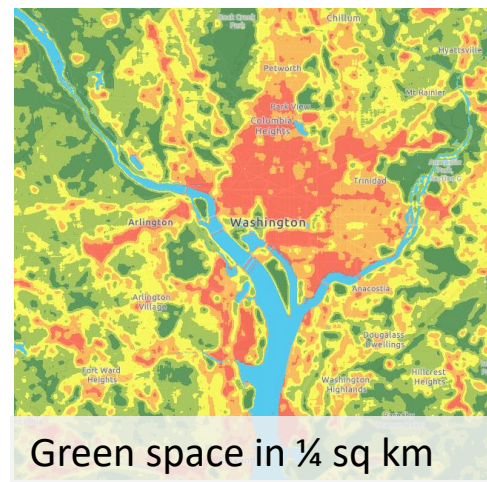
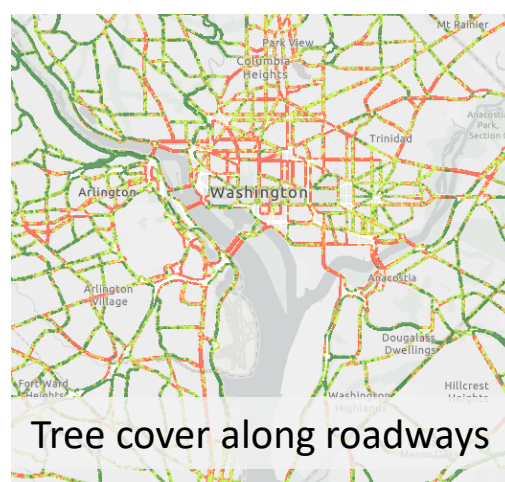
Pixel based / Raster

- Fine detail



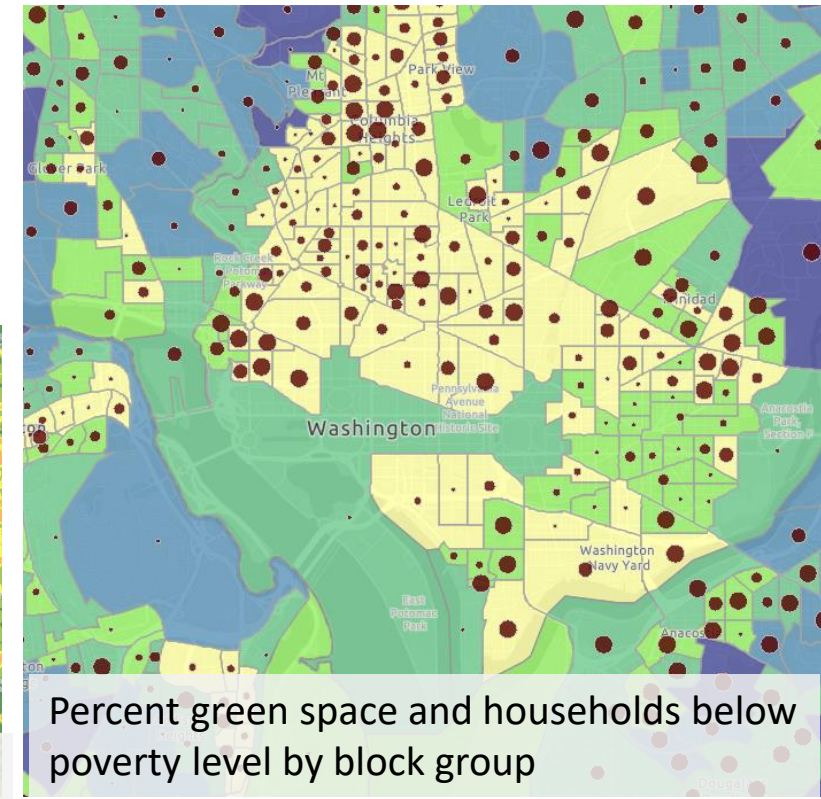
Lines/Vectors

- Individual features



Summaries by Census block group, Census tract, watersheds

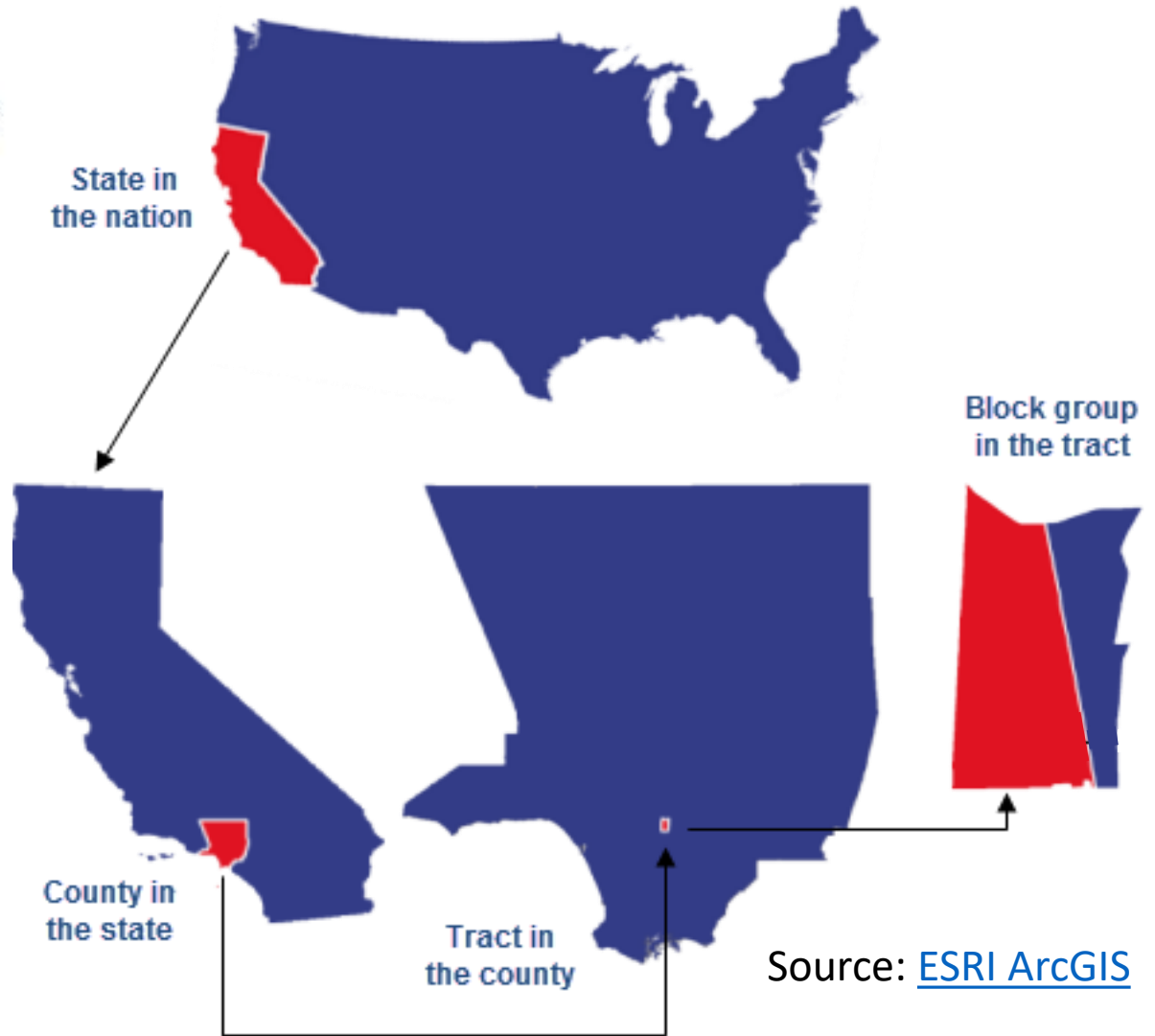
- Allows for data overlays



Summarized Data



~100,000 HUC12 units in US



~218,000 block groups in US

Source: [ESRI ArcGIS](#)

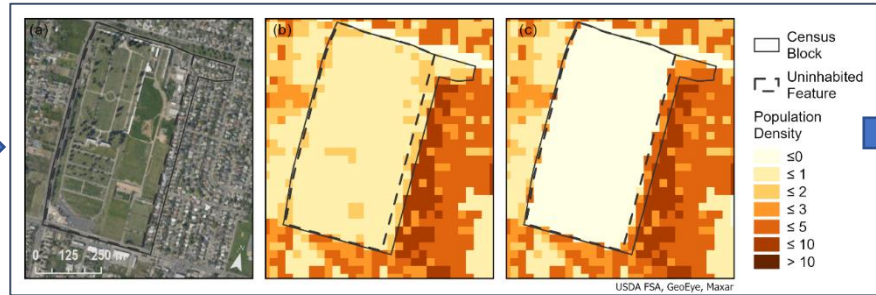
Source: [USGS](#)

Research to Action – Dasymetric Population Map

Article
Intelligent Dasymetric Mapping and Its Application to Areal Interpolation >
 Jeremy Mennis & Torrin Hultgren
 Cartography and Geographic Information Science, Volume 33, 2006 - Issue 3
 Published Online: 14 Mar 2013

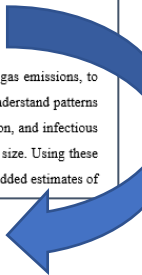


Developed data layer and toolbox



Improving Intelligent Dasymetric Mapping population density estimates at 30-meter resolution for the conterminous United States by excluding uninhabited areas
 Jeremy Baynes¹, Anne Neale¹, Torrin Hultgren²
 1. Center for Public Health and Environmental Assessment, US Environmental Protection Agency, Research Triangle Park, NC 27711, USA
 2. EPA National Geospatial Support Team, ITS-EPA III Infrastructure Support and Application Hosting Contract, Research Triangle Park, NC 27711, USA
 Correspondence: Jeremy Baynes (baynes_jeremy@epa.gov)

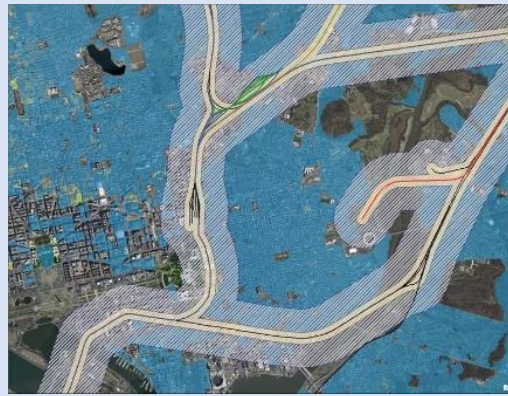
Abstract. Population change impacts almost every aspect of global change from land use, to greenhouse gas emissions, to biodiversity conservation, to the spread of disease. Data on spatial patterns of population density help us understand patterns and drivers of human settlement and can help us quantify the exposure we face to natural disasters, pollution, and infectious disease. Human populations are typically recorded by national or regional units that can vary in shape and size. Using these irregularly sized units and ancillary data related to population dynamics, we can produce high resolution, gridded estimates of



Uses

Assess exposure and environmental justice for people living near transportation infrastructure

- Collaboration with OTAQ
- Use Dasymetric Population data
- Summarize number of people living close to railways, railyards, ports, busy roadways & airports
- Assess EJ issues associated with 100, 200, 500, & 1000 m buffer sizes



Fueling research and decision-making

FLOOD LAB
 Can local zoning laws explain the discrepancy between the FIRM's floodplains and First Street risk model?

UC DAVIS
 UNIVERSITY OF CALIFORNIA

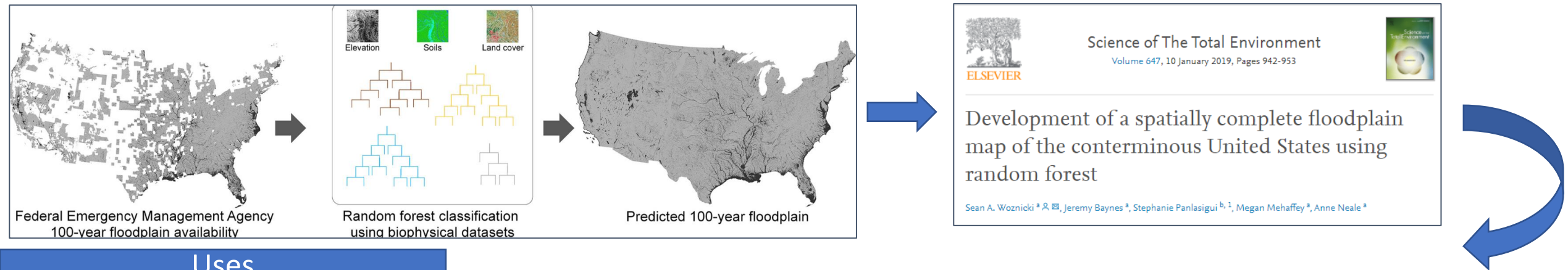
Mapping for More Inclusive Evacuation During Climate Emergencies
 by Megan Morrow / December 26, 2020
 Practical-Visionaries.org

PLOS ONE
 OPEN ACCESS PEER-REVIEWED
 RESEARCH ARTICLE
 Large-scale implementation of standardized quantitative real-time PCR fecal source identification procedures in the Tillamook Bay Watershed
 Xiang Li, Mano Sivaganesan, Catherine A. Kelly, Amity Zimmer-Faust, Pat Clinton, Jay R. Reichman, York Johnson, William Matthews, Stephanie Bailey, Orin C. Shanks
 Published: June 6, 2019 • <https://doi.org/10.1371/journal.pone.0216827>

Dasymetric Mapping of Census Data for Nepal towards Improved Disaster Risk Assessment Studies
 November 2015
 Conference: FIG – ISPRS workshop, 2015: International Workshop on Remote Sensing Professionals and SDI in Disaster Risk Reduction: In the Context of Post-Disaster Reconstruction - At: Kathmandu
 Project: [SERVIR-Himalaya](#)
 Authors:
 Hari Krishna Dhonju
 Pathway Technologies and Services Pvt. ...

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Viral and Bacterial Fecal Indicators in Untreated Wastewater across the Contiguous United States Exhibit Geospatial Trends
 Asja Korajkic, Brian McMillin, Michael P. Herrmann, Mano Sivaganesan, Catherine A. Kelly, Pat Clinton, Malika S. Nash, Orin C. Shanks
 Donald W. Schaffner, Editor

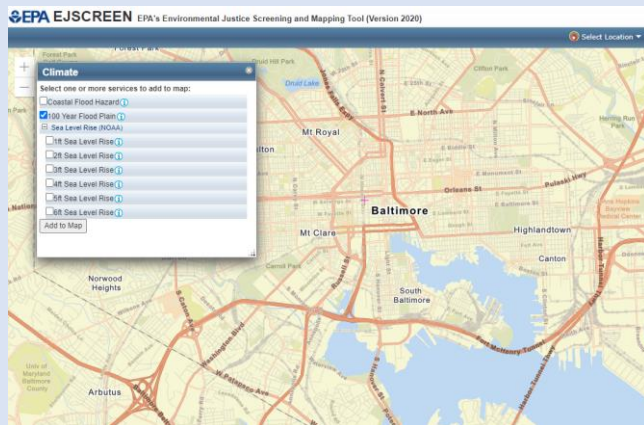
Research to Action – 100 yr Floodplain



Uses

Decision-making through other EPA Tools

- EJSCREEN
- R1 NPL Superfund Vulnerability Assessment Tool
- UST Finder Tool



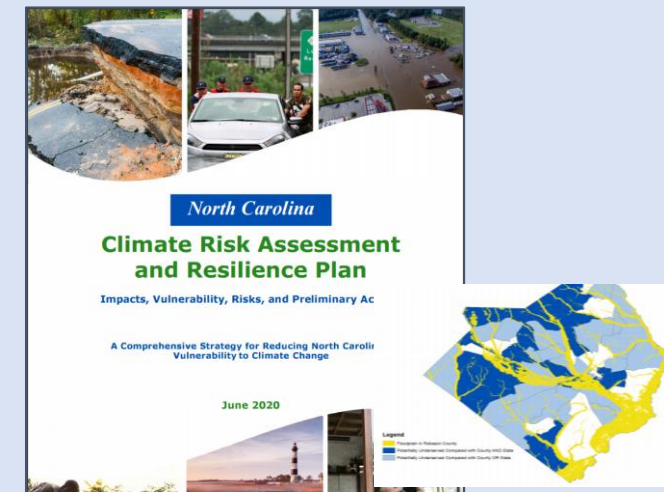
Vulnerable Infrastructure Assessment

- CDC Hospital and Medical Center Vulnerability Assessment

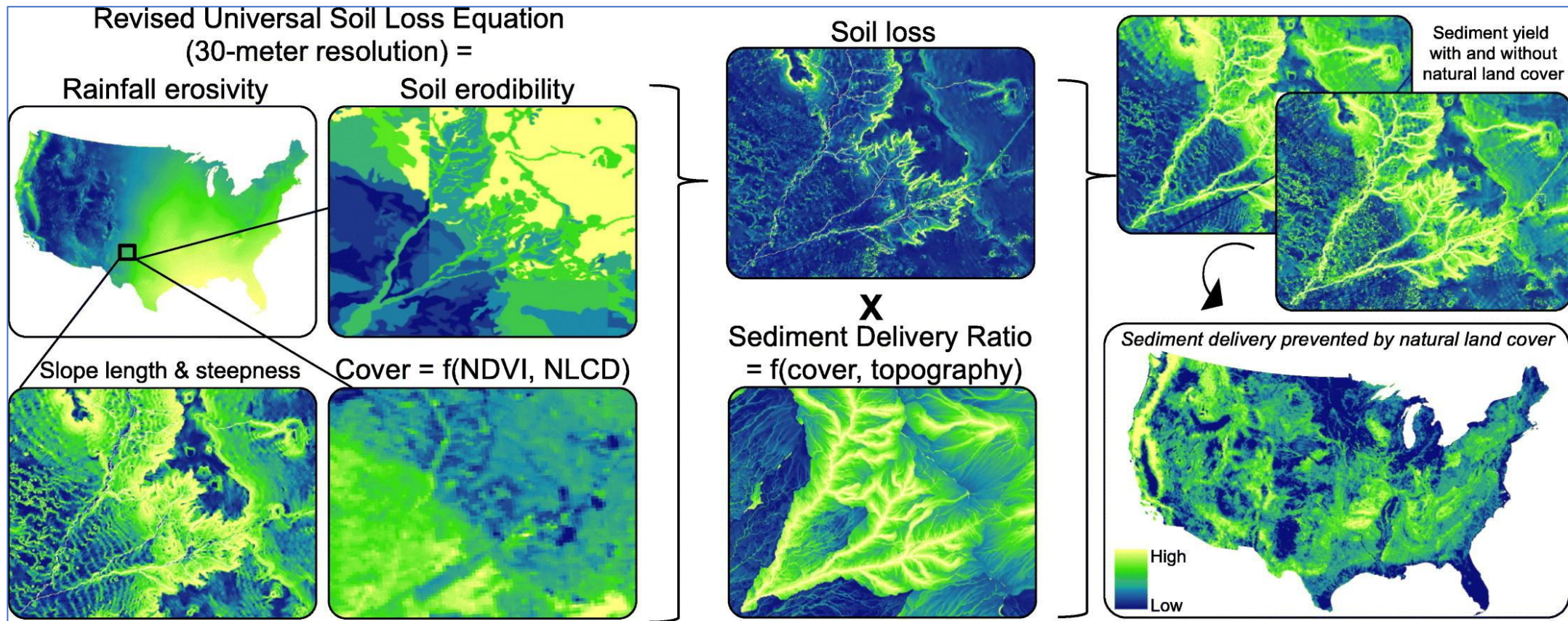


State Resilience Planning

- Chapter 4: Climate and Environmental Justice: Equity, Risk, and Resilience in North Carolina



Research to Action -- Erosion and Erosion Avoided



Science of The Total Environment

Volume 745, 25 November 2020, 140972



Sediment retention by natural landscapes in the conterminous United States

Sean A. Woznicki ^a, Peter Cada ^{b, 1}, James Wickham ^a, Michelle Schmidt ^b, Jeremy Baynes ^a, Megan Mehaffey ^a, Anne Neale ^a

Uses

- Pollutant fate and transport
- Benefits of natural land cover to water quality, land stability, etc.
- Identify where to protect, restore

EnviroAtlas & Environmental Justice

- Includes data relevant to environmental justice, such as:
 - Demographic Data
 - Opportunity Zones
 - Climate scenarios, flooding, exposure, and other environmental variables affecting vulnerable populations
 - Redlining (coming soon)
- Add data function allows for inclusion of:
 - EJSCREEN indices
 - Local data of interest
- Educational lesson plan (high school, undergraduate) incorporating EJ concepts and data from EJSCREEN

The background of the slide is a watercolor wash. It features a large, irregular shape in the center, filled with various shades of blue and green. The colors are soft and blended, with some darker areas and some lighter, almost white areas, creating a textured, artistic effect. The overall tone is natural and earthy.

Demonstration

<https://www.epa.gov/enviroatlas>

Where to Next

- **New Functionality**

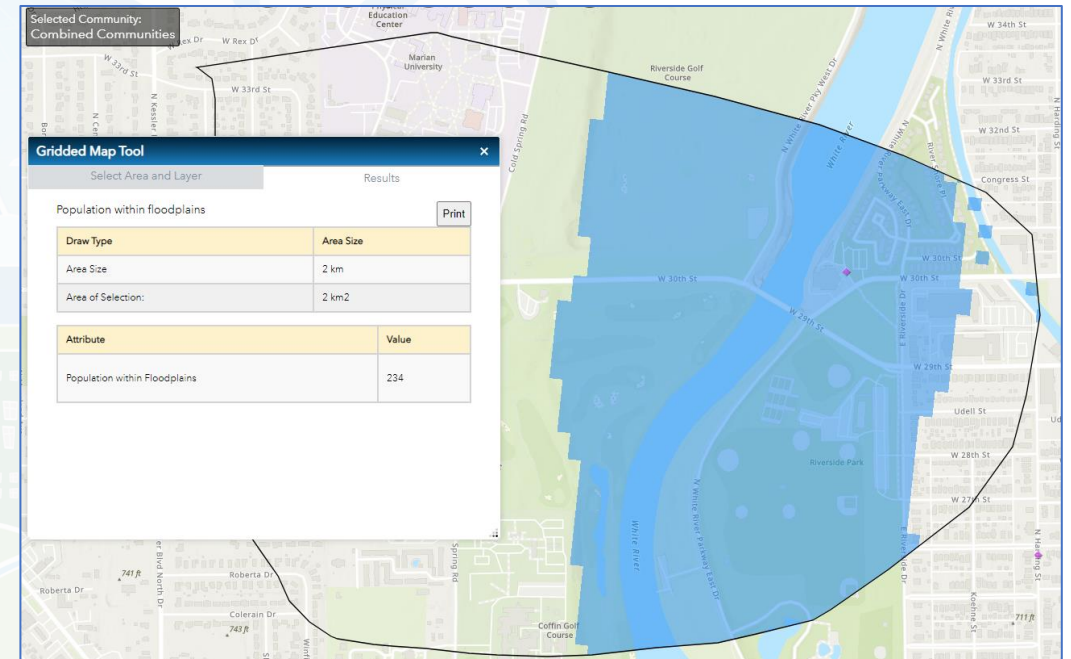
- Tool allowing users to combine data layers and calculate for any desired area
- Tool allowing users to create index values from multiple data layers
- Tool importing water quality data from WQ Portal

- **User Engagement/Outreach**

- Brownfields
- Training and training surveys

- **New Data**

- Number of days exceeding thresholds for air PM and Ozone
- Soil erosion, sedimentation, and retention
- Mines
- Harmful algal blooms
- Expanding time series





Thank You

Website: <https://www.epa.gov/enviroatlas>

Project email: enviroatlas@epa.gov

My email: Neale.anne@epa.gov

