

EPA Tools & Resources Training Webinar

EnviroAtlas

Connecting People, Nature, Health and
the Economy

Anne Neale & Jeremy Baynes

*Center for Public Health & Environmental Assessment
US EPA Office of Research and Development (ORD)*

June 6, 2024



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.

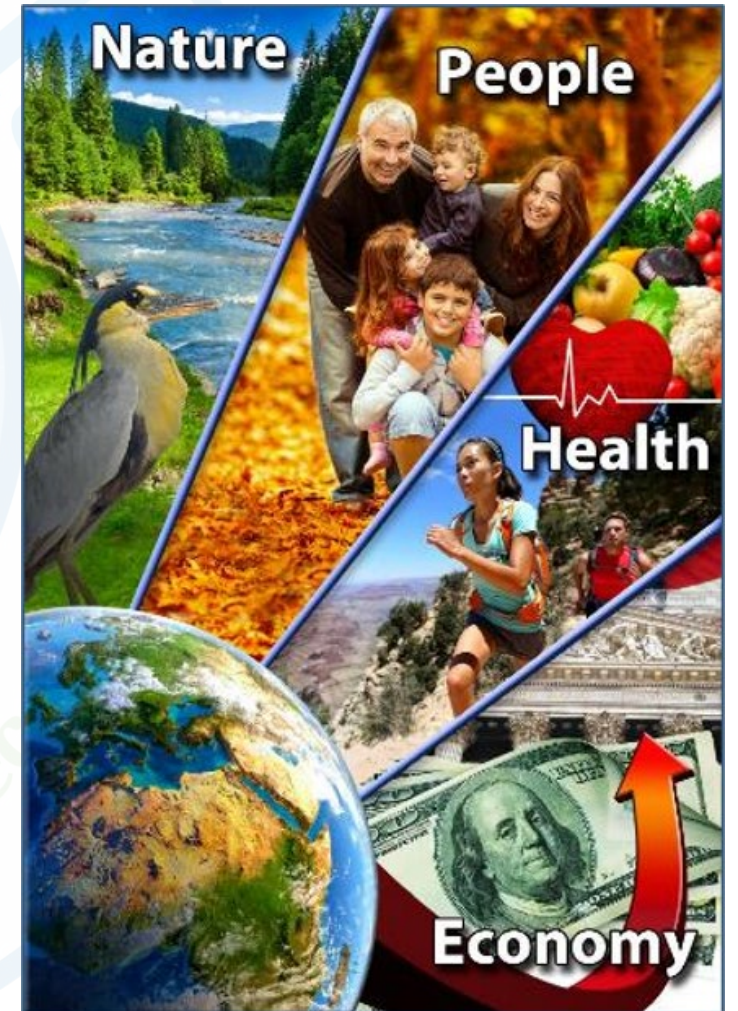
EnviroAtlas Includes:

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

The screenshot displays the EnviroAtlas Interactive Map interface. The top navigation bar includes the logo, search bar, and utility icons. The left sidebar, titled 'EnviroAtlas Data', lists 448 map layers with expand and hide icons. The main map area shows a geographical view of North America with a color-coded overlay representing a specific data layer. A blue circle at the bottom center contains the text 'EnviroAtlas Flagship tools'. To the right, a circular diagram titled 'Aesthetics & Engagement with Nature' illustrates the relationships between environmental factors (like Urban Ecosystems, Forests, Wetlands) and human health outcomes (like Anxiety, Depression, Happiness, Longevity).

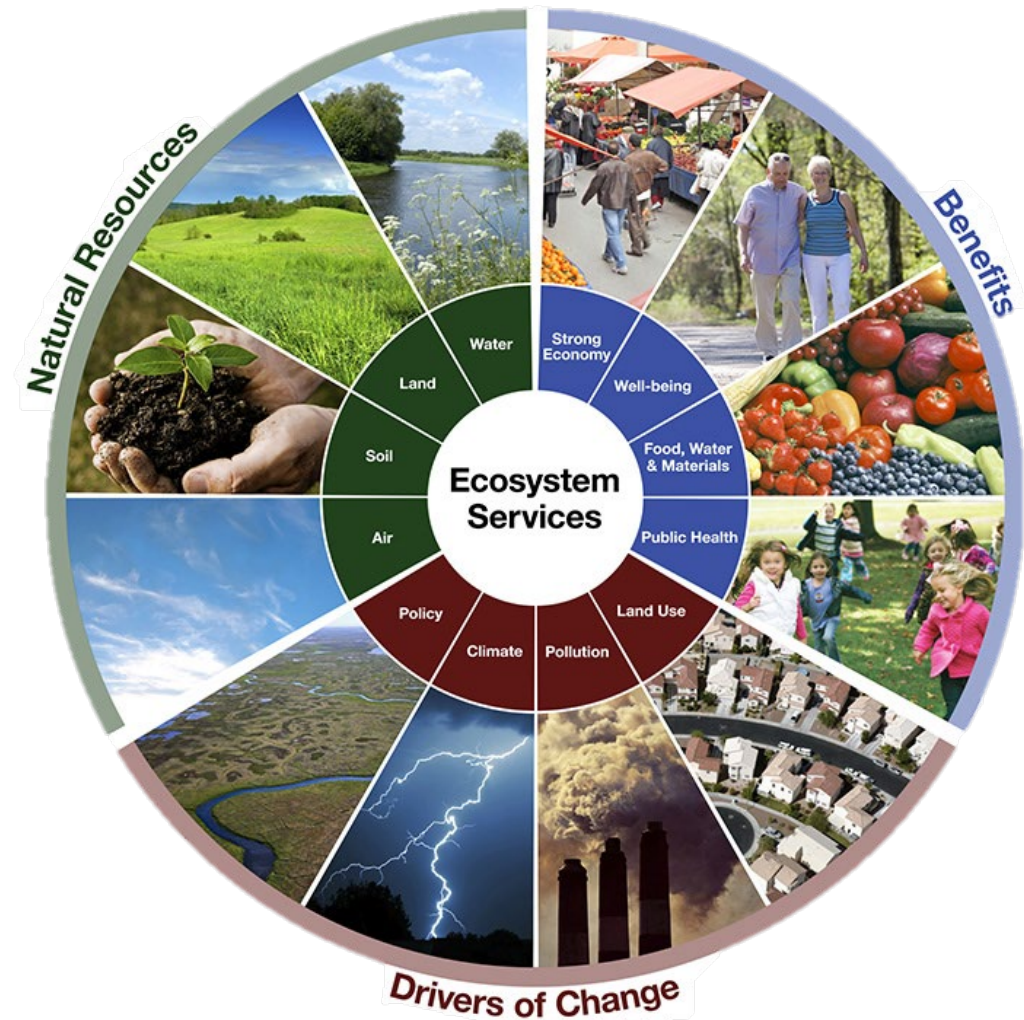
EnviroAtlas Objectives

- 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



Ecosystem Services

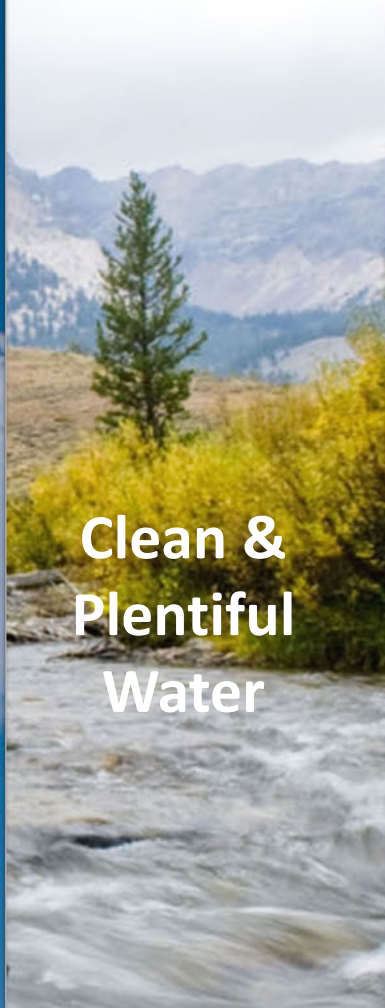
- ***Ecosystem services*** are the direct and indirect contributions of ecosystems to our well-being
- EnviroAtlas includes data layers representing the natural resources supplying the services, the benefits and beneficiaries, and the drivers of change



Clean Air



Clean & Plentiful Water



Biodiversity Conservation



Food, Fuel & Materials



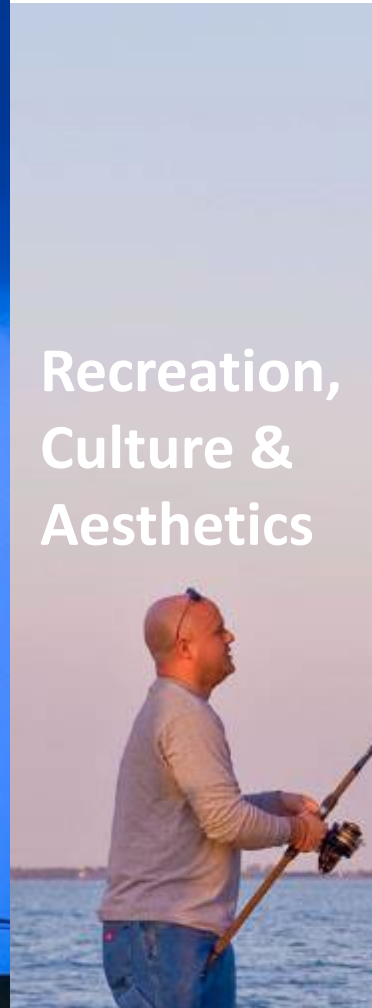
Natural Hazard Mitigation



Climate Stabilization

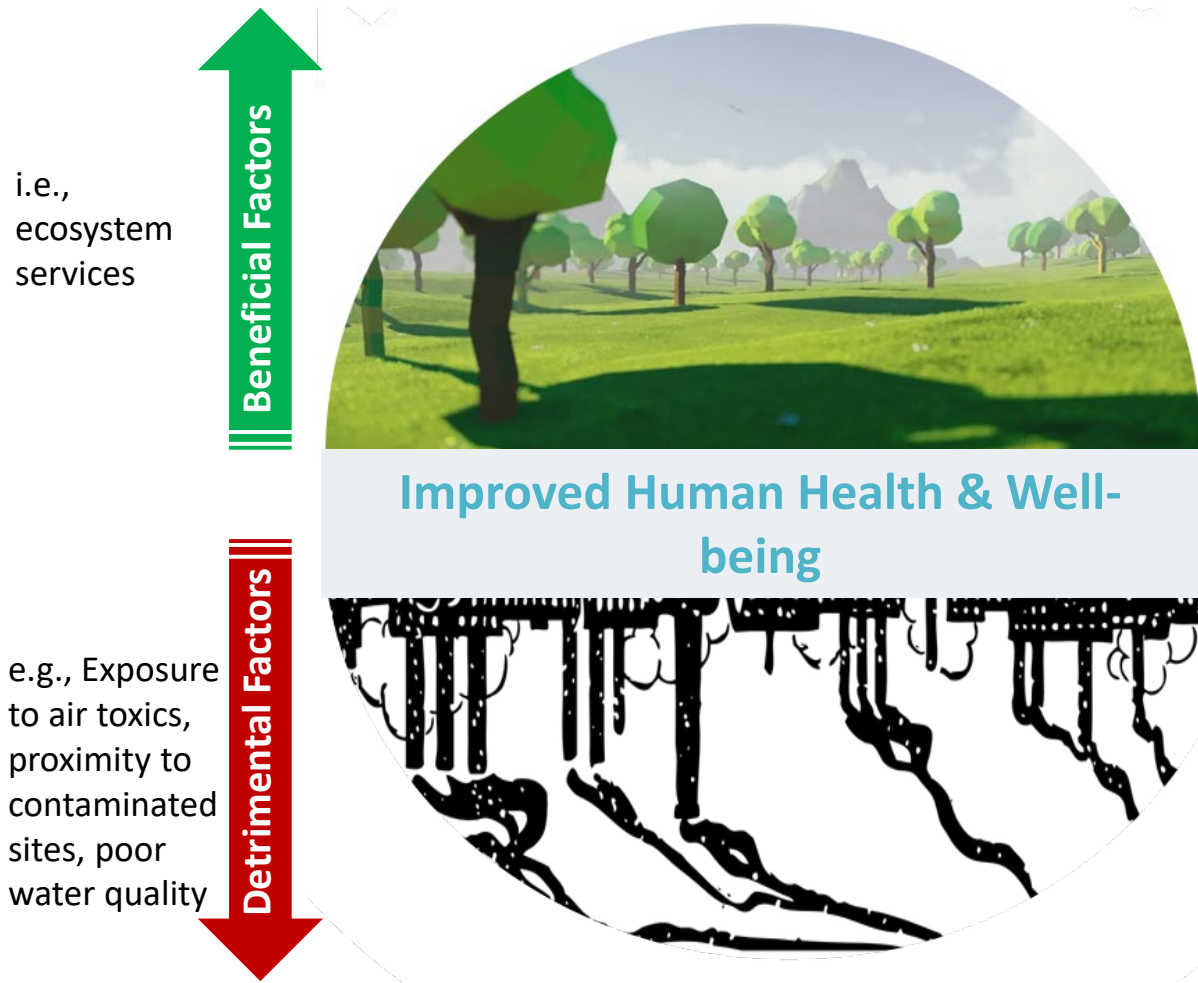


Recreation, Culture & Aesthetics



Ecosystem Services Benefit Categories

The Eco-Health Paradigm



Ecosystem Services

Health Promotional

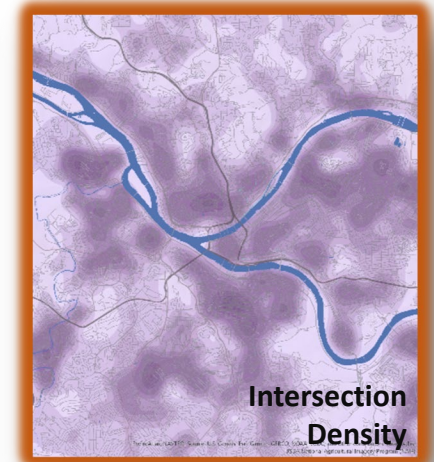
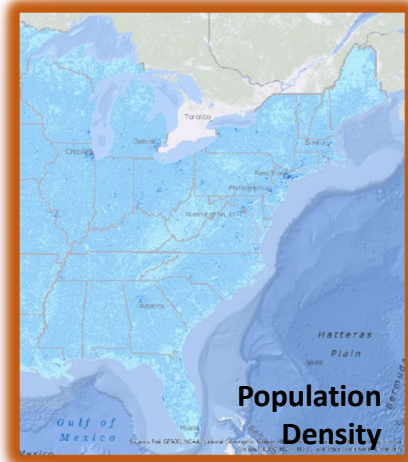
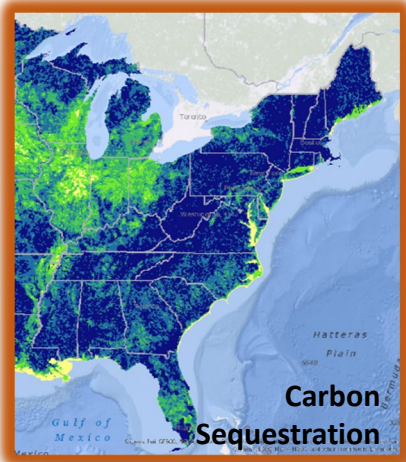
- Physical activity
- Social interactions
- Engagement with nature
- Adventure

Hazard Buffering

- Air pollutant mitigation
- Water pollutant mitigation
- Heat reduction
- Noise reduction
- Flood buffering

Health Maintenance

- Clean air
- Clean water
- Conditions to grow healthy food



National Data

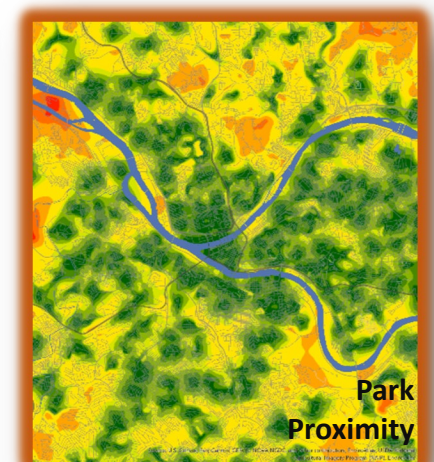
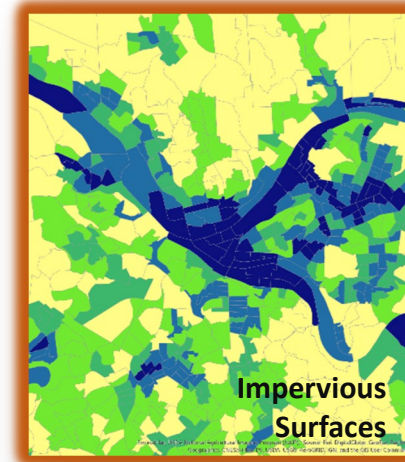
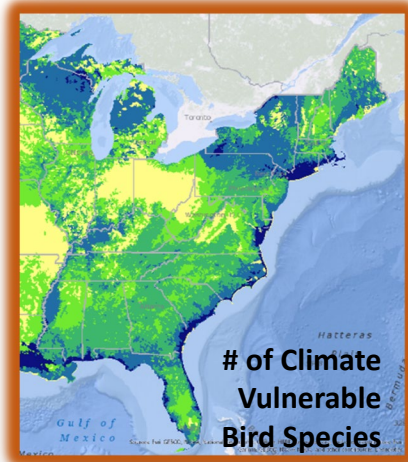
30-meter land cover
 400+ unique data layers
 Consistent data for the
 conterminous US

EnviroAtlas

Peer-reviewed
 Standard Metadata
 Open access

Community Data

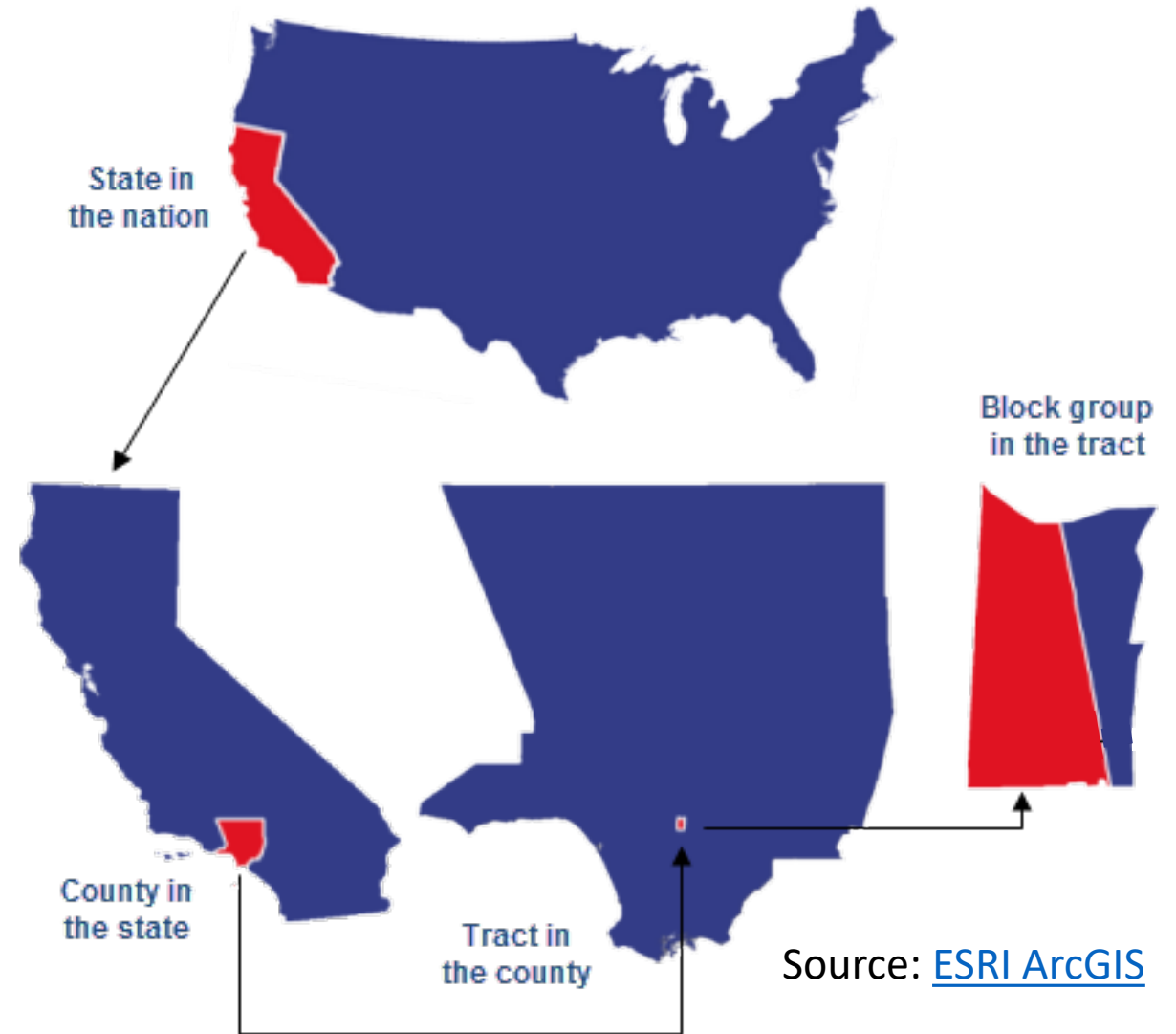
1-meter land cover
 100+ unique data layers
 30 metropolitan areas
 1450 cities & towns (65+ million people)



Summarized Data



Source: [USGS](https://www.usgs.gov/)



Source: [ESRI ArcGIS](https://www.esri.com/)

~100,000 HUC12 units in US

~218,000 block groups in US

Data in EnviroAtlas

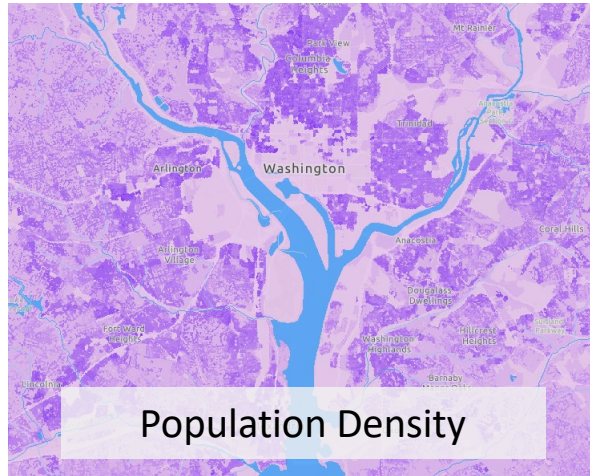
- EnviroAtlas provides data at multiple extents and scales

Summaries by geographic unit

- Allows for data overlays

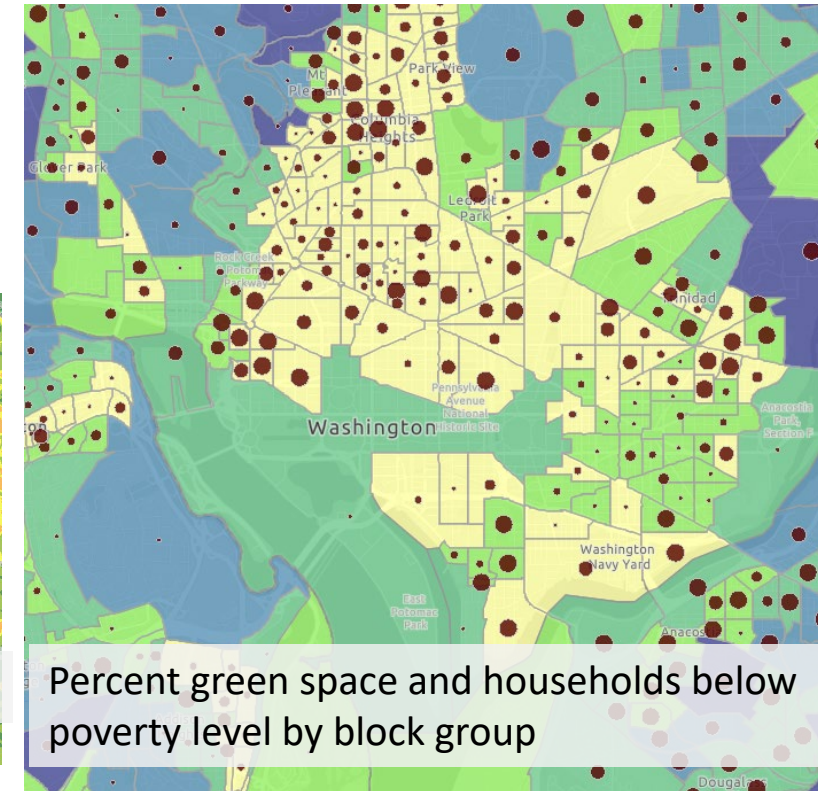
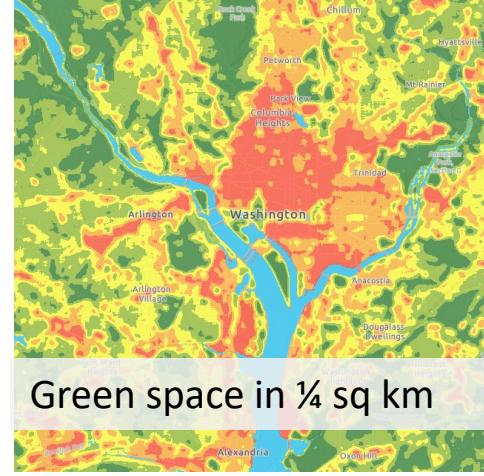
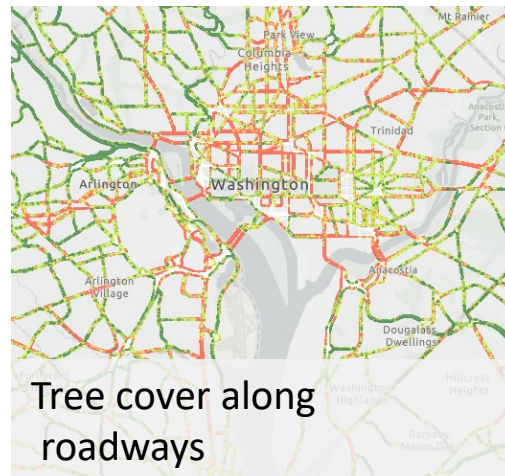
Pixel based / Raster

- Fine detail



Lines/Vectors

- Individual features



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 U.S. 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, and other insects, provide a critical service to ecosystems. About 75% of all wild 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.⁵ Native pollinators require blooming plants throughout the growing season and nesting habitat in tree cavities or abandoned insect or rodent nests.⁶

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 each 12-digit HUC that are enrolled in the CRP. The map can be used to compare CRP acres that may be in need of wetland ecosystem services to wetland ecosystem services.

Use Cases

EnviroAtlas Examples



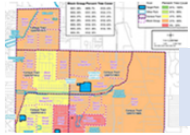
Prioritizing Tree Planting in Durham, NC

- 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)

Is it whether to adopt a and organizations to es in county parks. [PDF,

EnviroAtlas - Accessing a National Dataset

Search All Layers: 427 of 427 Maps

Layers:

- 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
- Modelled O1, O2, O3 species
- Modelled IUCN threatened terrestrial vertebrate species
- Modelled Partners in Flight species
- Modelled Partners in Flight Watch List bird species
- Modelled State of the Birds species of conservation concern
- Modelled threatened and endangered vertebrate species

Watch on YouTube

Tutorials

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



Let's join the
18,850 people who
used EnviroAtlas
last month and go
live!

EnviroAtlas



Human health and well-being are closely tied to the environment, which provides benefits such as clean water, clean air, and protection from natural hazards, also known as ecosystem goods and services. EnviroAtlas provides geospatial data, easy-to-use tools, and other resources related to ecosystem services, their chemical and non-chemical stressors, and human health.

About EnviroAtlas

- About Ecosystem Services
- Frequently Asked Questions
- What's New?

Interactive Applications

- EnviroAtlas Interactive Map | Discover and use hundreds of maps.
- Example Projects that Use EnviroAtlas
- Eco-Health Relationship Browser | Explore eco-health connections.

How to Use EnviroAtlas

- Training and Tutorial Videos
- Brownfields Applications
- Health Impact Assessments

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

<https://www.epa.gov/enviroatlas/enviroatlas-use-cases>

EnviroAtlas Use Cases

EnviroAtlas data and resources can be used to inform a range of projects, from regional to local scales. For example, EnviroAtlas data have been used to support conservation planning, to understand the benefits of ecosystems for public health, and to implement nature-based solutions. 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!](#)

On this page: [EnviroAtlas Examples](#) | [Examples from our User Community](#)

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. Planting trees and other vegetation in cities is a nature-based solution that can help reduce urban heat islands. [This example explores one solution for minimizing the negative impacts of excessive summer heat due to urbanization in Portland, OR.](#) [PDF, 2017]

Relevant Links

Tips on how to use EPA's EnviroAtlas Interactive Map

Sample data layers/maps:

Source	Category	Variable
EnviroAtlas Data	Land Cover Type	Percent Wetlands
EnviroAtlas Data	Hydrologic Features (waterbodies)	Wetlands V2
EnviroAtlas Data	Political Boundaries	State & County Lines
2012-2016 ACS	Income/Poverty	Households below Poverty Level
2012-2016 ACS	Population	Percent population under age 18

Have additional questions? EnviroAtlas@epa.gov Prefer a step-by-step document? <http://bit.ly/EnviroAtlasWebquest>

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

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

Status of EnviroAtlas

Current Status

EnviroAtlas has been publicly available since May 2014 ([News Release, May 7, 2014](#)). Development plans for EnviroAtlas extend through 2025, with regular updates taking place as they become available. View the [EnviroAtlas Dynamic Data Matrix](#) to search and sort through a list of currently available EnviroAtlas data.

Recent Updates/Changes to EnviroAtlas

Review the [list of recent changes and updates](#) to the EnviroAtlas Interactive Map.

Update Bulletins

Read our latest [Update Bulletin \(February 2024\)](#) or look through the [bulletin archives](#) to learn about the newest changes and additions to EnviroAtlas.

Recent Webinars

- 01/27/2022 | [EnviroAtlas Introduction for Watershed Resources Registry \(WRRP\) PowerHour](#)

EnviroAtlas Update Bulletin

Our quarterly bulletins cover the latest EnviroAtlas updates including new publications, data, features, and resources such as lesson plans.

[Subscribe to receive our Update Bulletins](#)

Analytical Tools Interface for Landscape Assessments (ATtILA)

ATtILA is an easy to use Esri ArcGIS toolbox that calculates landscape and landscape/human interaction metrics, including many of those found in EnviroAtlas. It accepts data from a broad range of sources and is equally suitable across all landscapes, from deserts to rain forests to urban areas.



Three Metric Groups are Included in the Toolbox:

- Landscape Characteristics:** Metrics related to land cover proportions and patch metrics (e.g. percent forest cover or number and size of forest patches)
- People in the Landscape:** Metrics related to population, roads, and the built environment (e.g. population change or road/stream crossings)
- Riparian Characteristics:** Metrics related to land cover adjacent to streams and lowlands (e.g. percent of crop land within 30 meters of streams)

To learn more about the toolbox, please refer to the [ATtILA Fact Sheet \(pdf\)](#) (331.7 KB). Detailed information for technical users of the toolbox can be found on the [ATtILA repository](#).

<https://www.epa.gov/enviroatlas/attila-toolbox>



<https://www.epa.gov/enviroatlas/enviroatlas-educational-materials>

EnviroAtlas Educational Materials

Overview of Educational Materials

- EnviroAtlas tools can be used in formal and informal educational settings.
- There are ready-made lesson plans for every grade level, from kindergarten through undergraduate.
- All lessons are aligned with Next Generation and State Science Standards for each grade in the Appendix.



Exploring Your Watershed (Grades K - 6)

Intro to Ecosystem Services (Grades 4 - 6)

Key Takeaways

EnviroAtlas resources are:

- Easy to use
- Used by all levels of government, non-profit organizations, researchers, universities, K-12 schools
- Used to inform a myriad of environmental / socioeconomic issues, e.g.,
 - Climate resilience planning
 - Conservation planning
 - Environmental justice
 - Exposure assessments
 - Total Maximum Daily Loads (TMDLs) to meet water quality standards
 - Tree planting
 - Education
- Used to inspire additional data development / tools
- ***Dependent on you, the users for feedback to improve the tool!***

Contact Us

Please contact us with questions, to provide feedback, or to share with us how you are using EnviroAtlas!

Anne Neale

Research Scientist/EnviroAtlas Lead
Center for Public Health & Environmental Assessment
US EPA ORD

Neale.Anne@epa.gov

Jeremy Baynes

Computer Scientist/Technical Lead
Center for Public Health & Environmental Assessment
US EPA ORD

Baynes.Jeremy@epa.gov

EnviroAtlas Team

EnviroAtlas@epa.gov