



# Chesapeake Bay Program | STAR group

## EnviroAtlas: Capturing Nature's Benefits and Mapping a Sustainable Future

**Jessica Daniel & EnviroAtlas Colleagues**

*Center for Public Health and Environmental Assessment  
U.S. EPA Office of Research and Development*

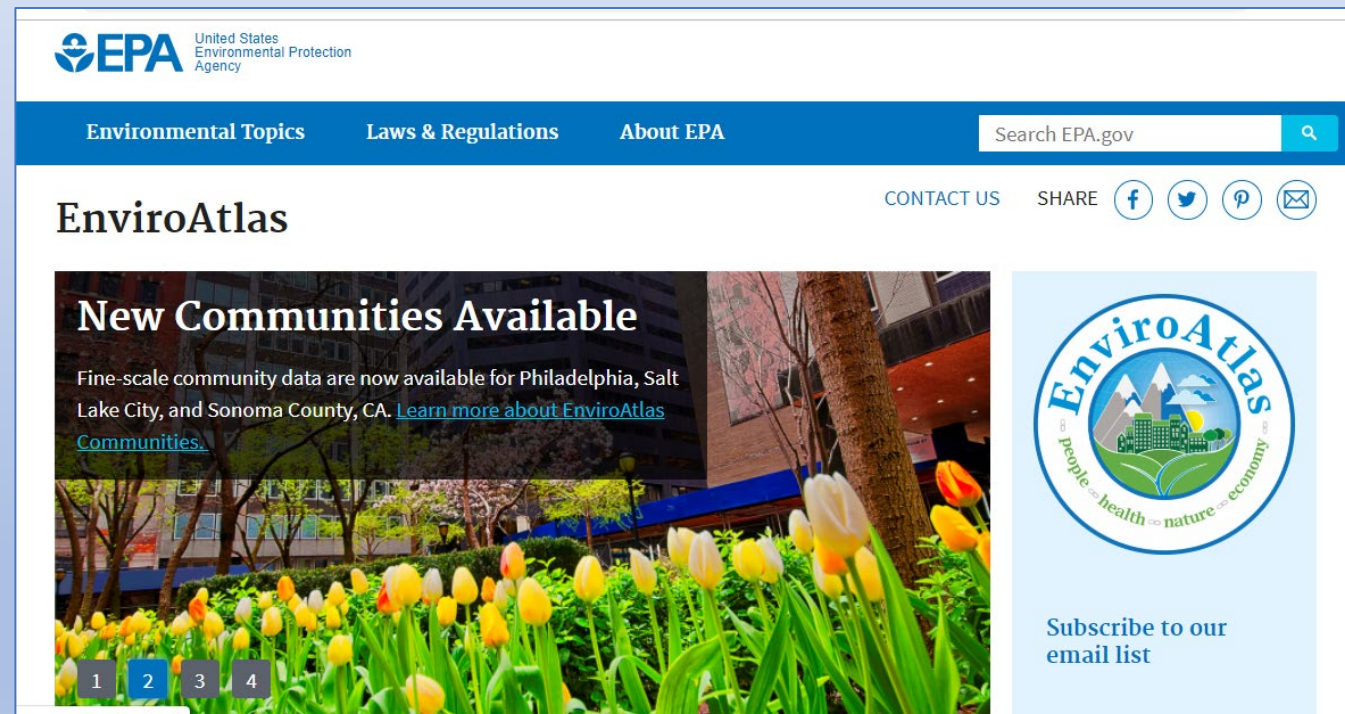
**May 28, 2020**



**EnviroAtlas** is a public website with interactive tools that states, tribes and the public are using to help inform policy and planning decisions.

- Increases ability for technology transfer through interactive tools
- Broadly applicable across scales, topic areas, uses
- Provides streamlined access to wealth of data
- Offers consistent format and documentation via metadata and fact sheets

[www.epa.gov/enviroatlas](http://www.epa.gov/enviroatlas)



# Ecosystem Services and EnviroAtlas



- Ecosystem services are critically important to human well-being, but are often overlooked, mainly due to lack of information.
- EnviroAtlas seeks to fill this information gap by providing needed information and data in one accessible place.

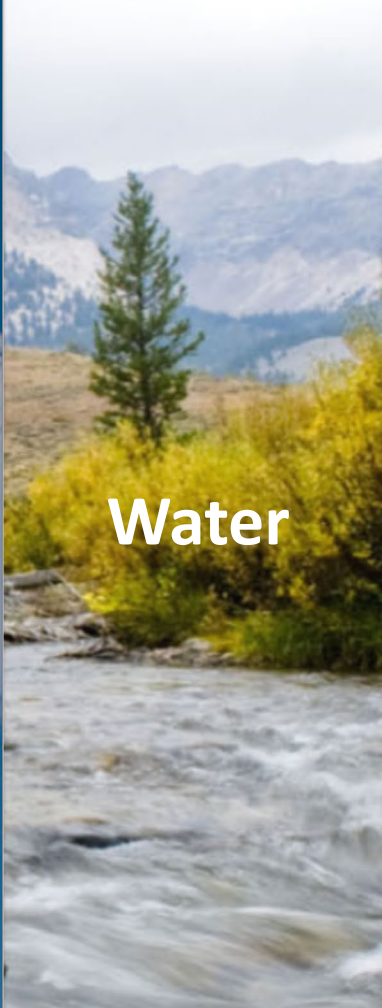
**Air**



**Biodiversity**



**Water**



**Food & Materials**



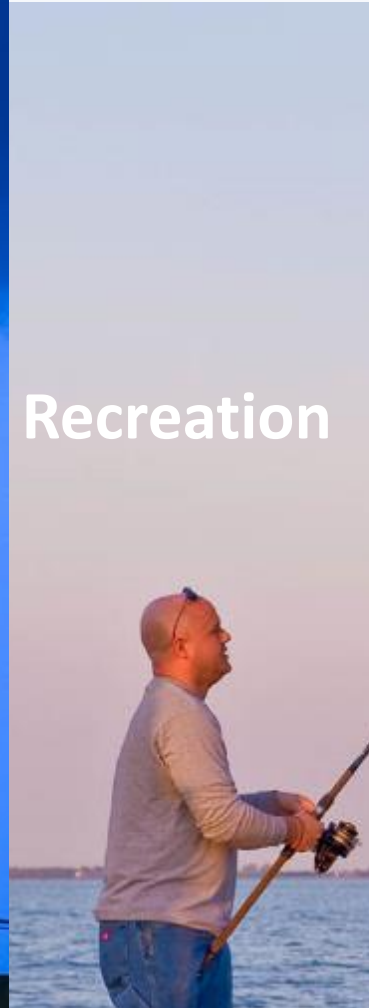
**Hazard Mitigation**



**Climate**



**Recreation**

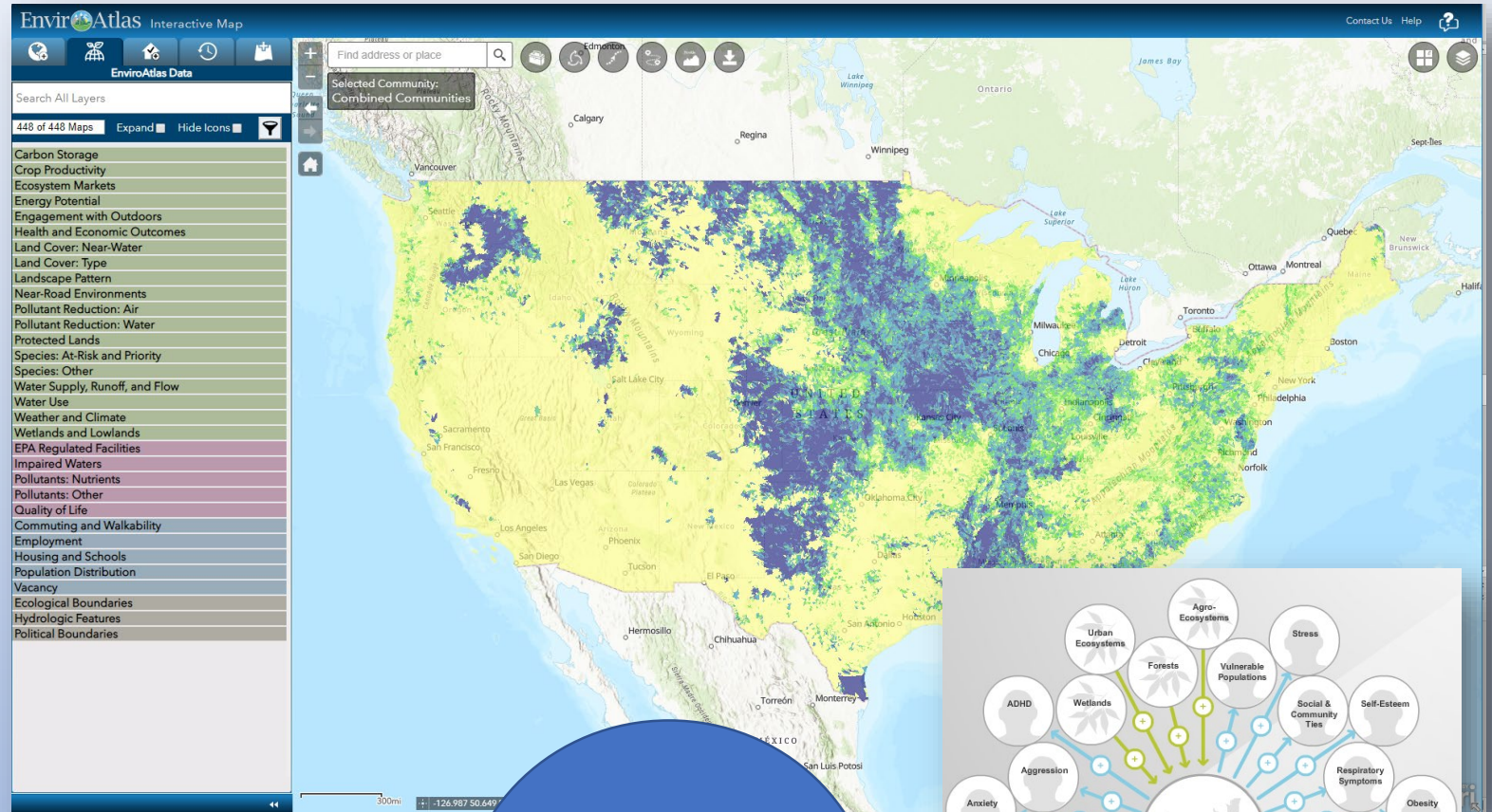


**Ecosystem Services Benefit Categories**



# EnviroAtlas Includes:

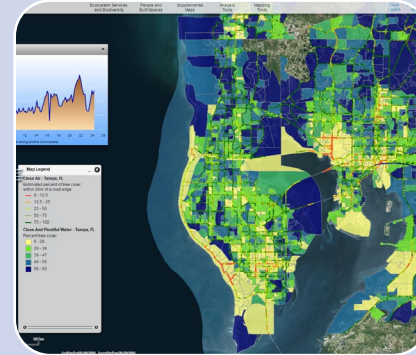
- Interactive Mapping Application
- Eco-Health Relationship Browser
- 400+ Geospatial Datasets
- Analytic and Interpretive Tools
- GIS Toolboxes
- Video Tutorials (new)
- Educational Lesson Plans (new)
- Guide for use in Health Impact Assessment



EnviroAtlas  
Flagship tools



# EnviroAtlas Educational Curriculum



**K- 6**

*Exploring  
Your  
Watershed*

*Also available  
in Spanish*

**4 - 6**

*Introduction  
to Ecosystem  
Services*

*Suite of 6  
mini lessons*

**4 -12+**

*Connecting  
Ecosystems  
and Human  
Health*

**9 - 12+**

*Building a  
Greenway  
Case Study*

- Four lesson modules, with hands-on and outdoor portions
- Align with Next Generation Science Standards and individual State Science Standards
- Adaptations available for each lesson

## 5 Ecosystems:

- Forests
- Urban ecosystems
- Wetlands
- Agro-ecosystems
- Drylands

## 6 Ecosystem Services:

### *Health promotional services*

- Aesthetics & Engagement with Nature
- Recreation & Physical Activity

### *Buffering services*

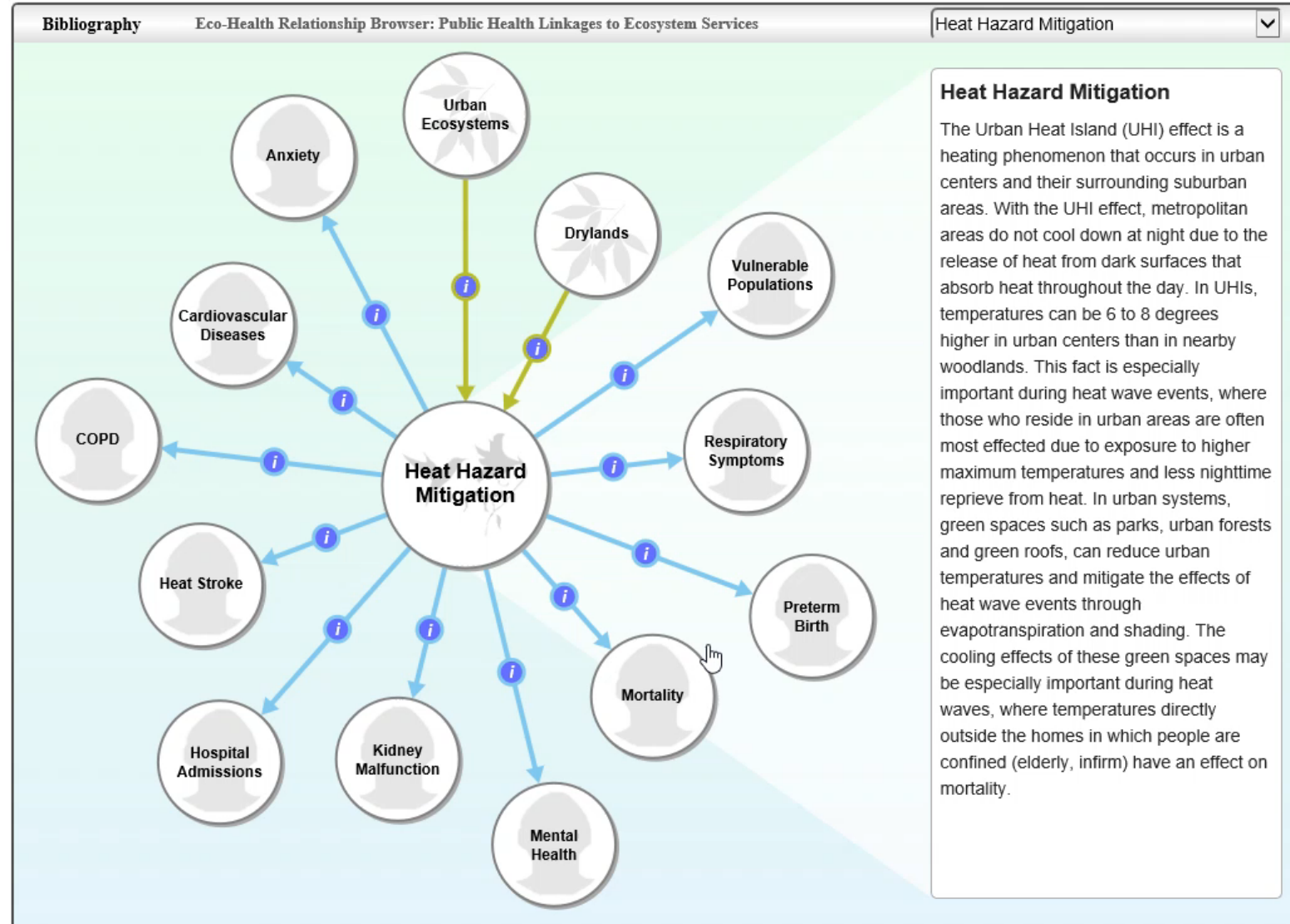
- Air Quality
- Water Quality
- Heat Hazard Mitigation
- Water Hazard Mitigation

## 30+ Health Outcomes:

- Asthma
- ADHD
- Cancers
- Cardiovascular diseases
- Heat stroke
- Healing
- Low birth weight
- Obesity
- Social relations
- Stress
- **+ More**

# Eco-Health Relationship Browser

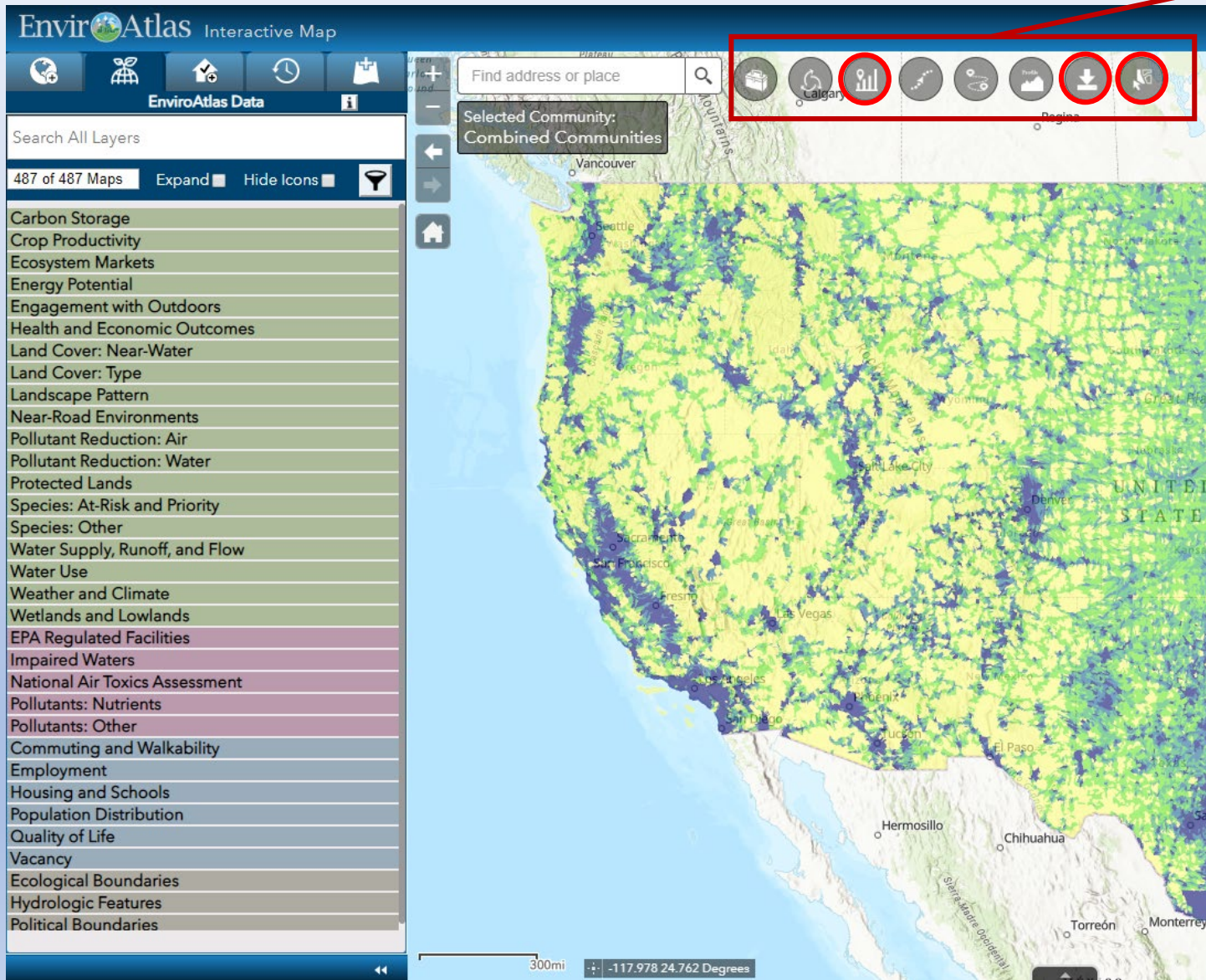
Click on the topic bubbles to explore. Click on the linkages ( *i* ) to view the relationship between elements.



**Evidence-based associations**  
*700+ scientific articles*

# EnviroAtlas Interactive Map

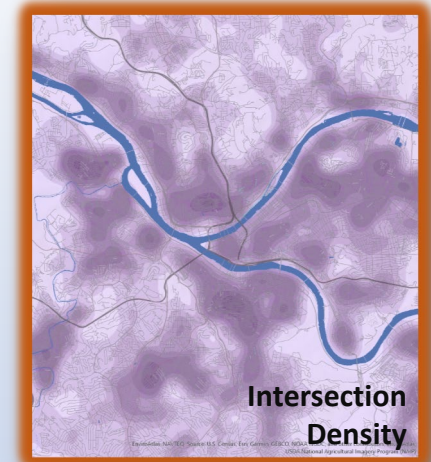
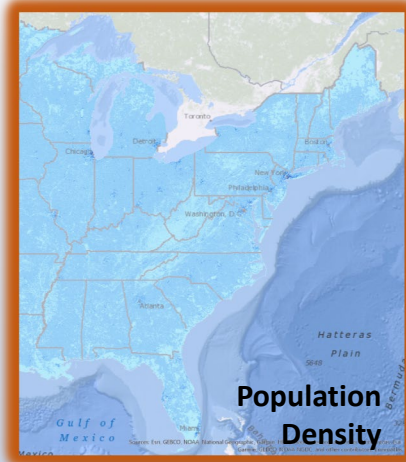
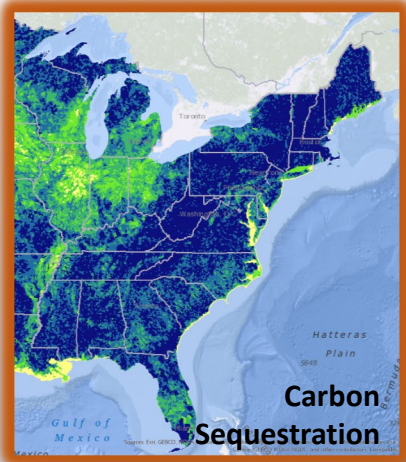
Data Topics



## Built-in analysis tools

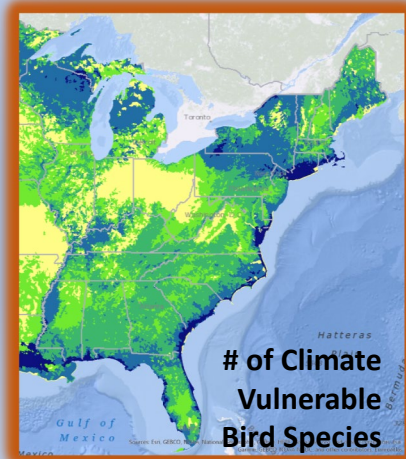
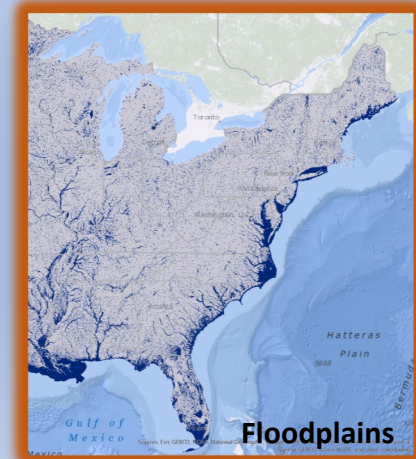
- Access EnviroAtlas Data:
  - Via our Interactive Map
  - Use web services
  - Download data
- Users can add their own data to our map for a session
- Users can search for data from the internet and add to map
- Save your session and return to it





## National Data

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

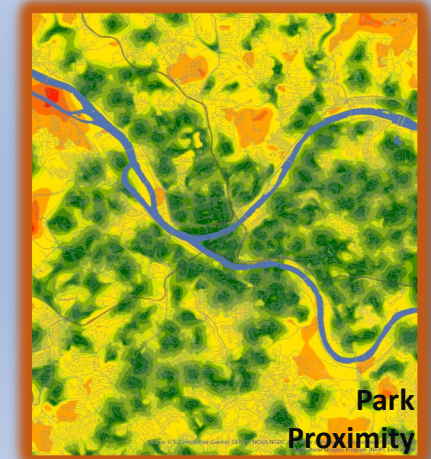
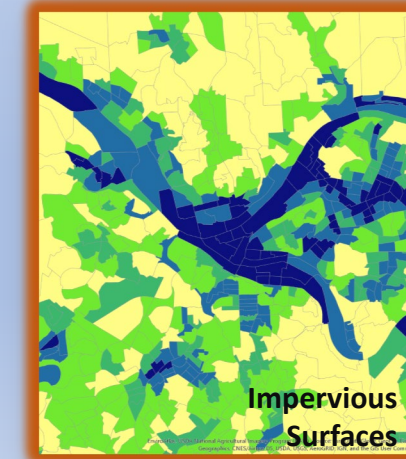


**EnviroAtlas**

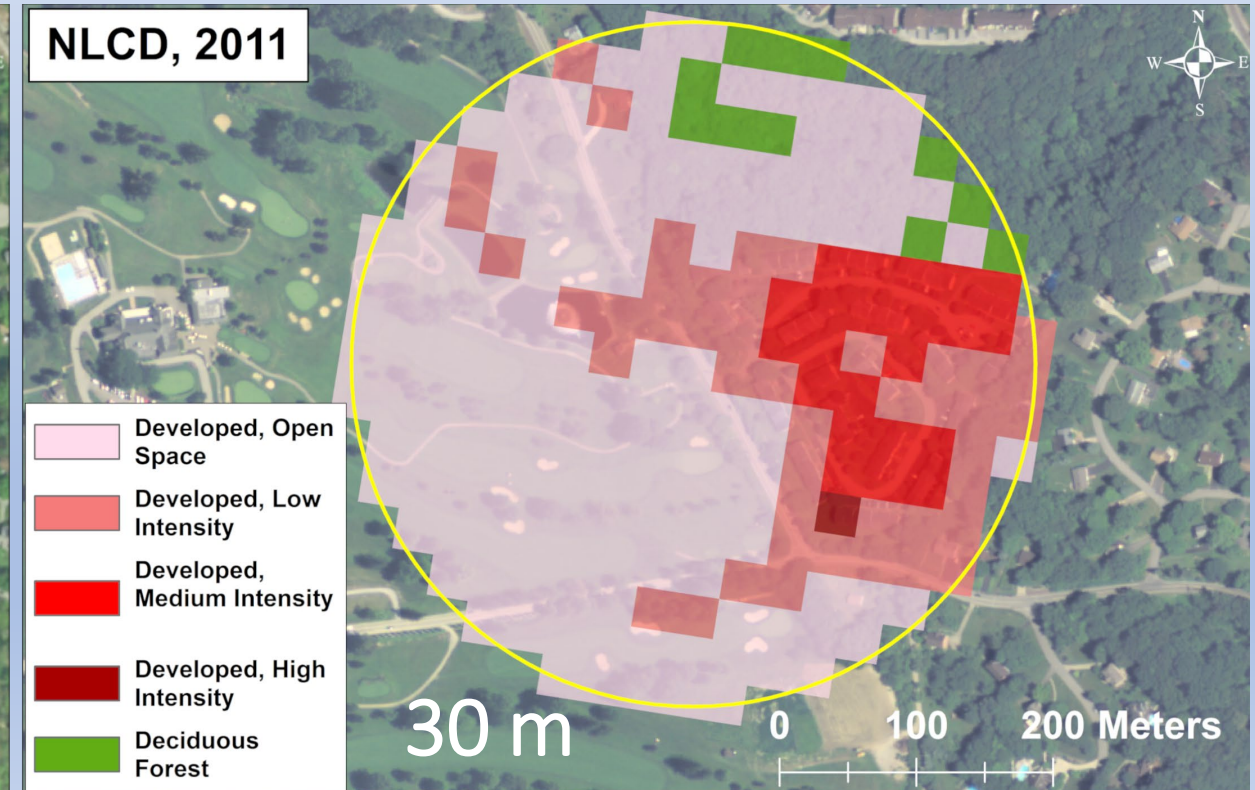
Data Fact Sheets  
 Peer-reviewed  
 Standard Metadata  
 Open access

## Community Data

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



Land cover is an important input

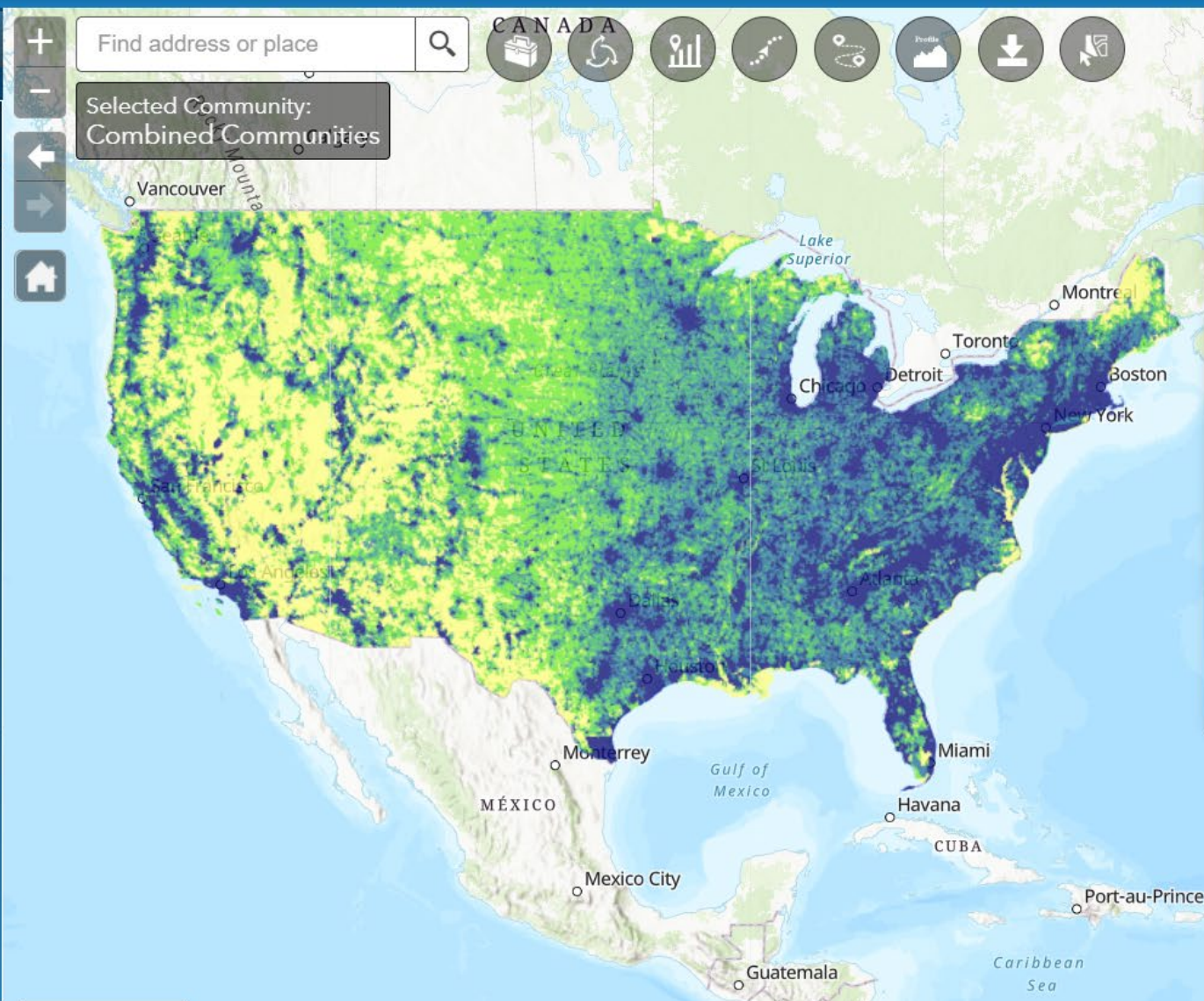


EnviroAtlas Data

Search All Layers

487 of 487 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
- National Air Toxics Assessment
- Pollutants: Nutrients

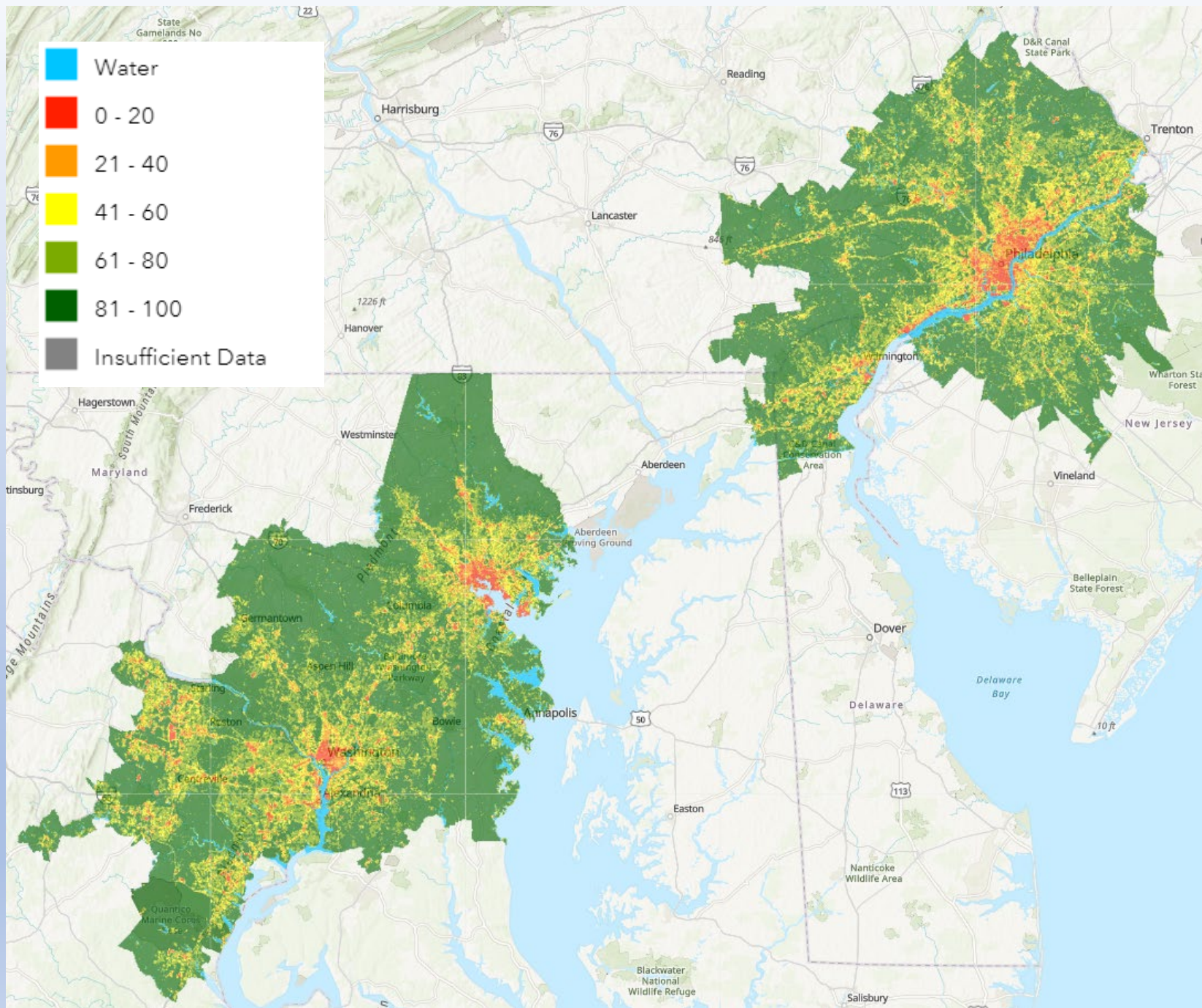


**Legend**

Domestic water use (million gallons/day)

- 0.1612 - 236.8563
- 0.0404 - 0.1611
- 0.0072 - 0.0403
- 0.0007 - 0.0071
- 0.0000 - 0.0006

400+ indicators

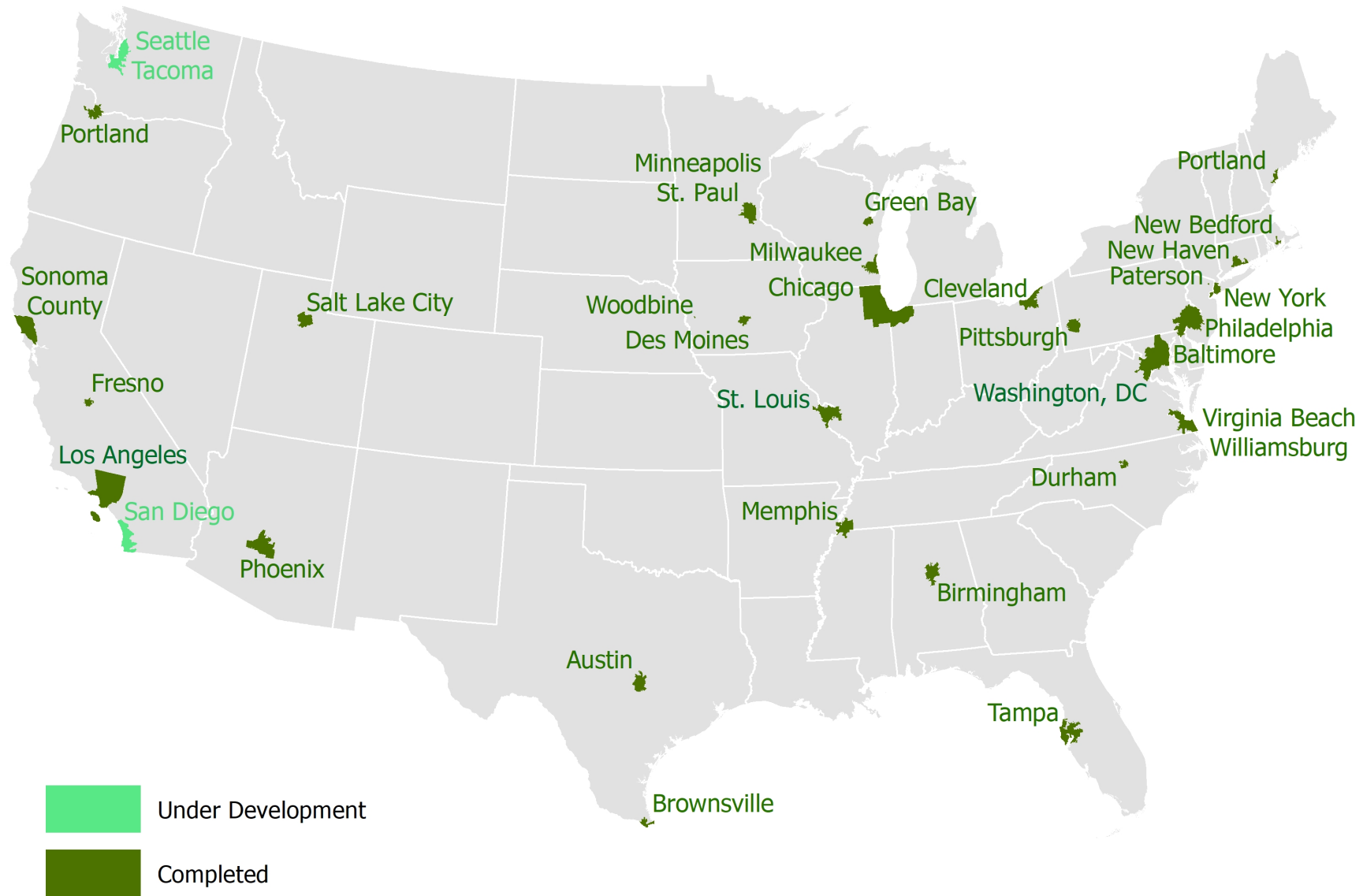


**Baltimore MD;  
Washington DC, and  
Philadelphia PA**

*Percent green space in 1/4 sq  
km*

**100+  
indicators**

# High-resolution data



# What Types of Questions can EnviroAtlas Answer?

- Where are there contaminated sites in my community? Are they at risk for flooding?
- Where do I have impaired water bodies and inadequate stream buffers?
- Where do I have a high number of children with little access to parks?
- Where do I have critical ecological resources and are they currently protected?
- What are the point sources upstream of where I am withdrawing my drinking water?
- Where could I restore wetlands? Where would I gain the most benefit?
- Where do I have a high number of people living in close proximity to busy roads? Without/with adequate tree buffers?

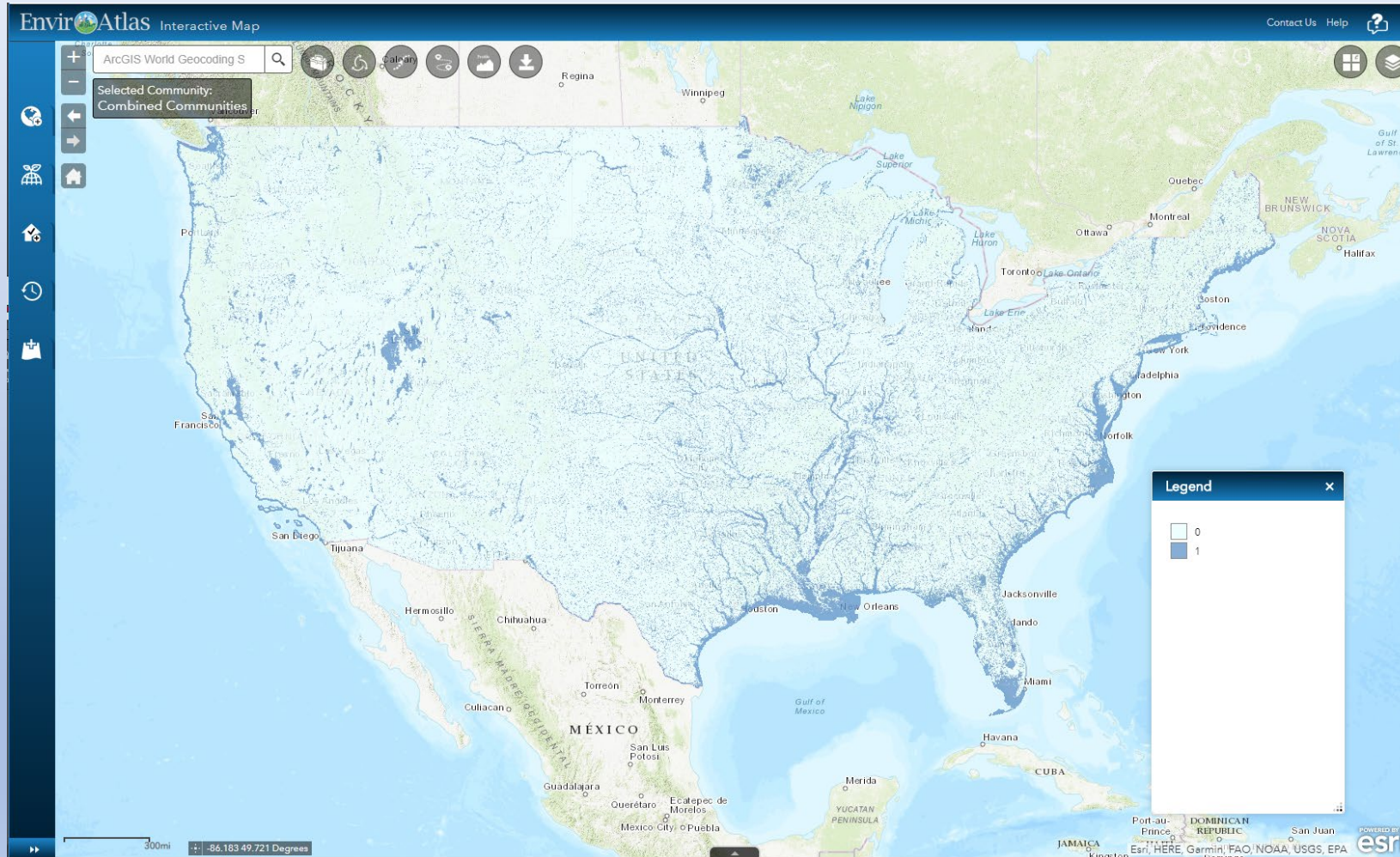
# Demonstration



How are states,  
communities,  
others using  
EnviroAtlas?



# Where are floodplains?



EPA region	Count of NPL Superfund Sites in Floodplain	EPA Region	Count of Brownfields Sites in floodplains
01	26	01	406
02	34	02	160
03	23	03	456
04	37	04	586
05	42	05	913
06	30	06	255
07	14	07	367
08	11	08	198
09	9	09	539
10	12	10	149
<b>Total</b>	<b>238</b>	<b>Total</b>	<b>4029</b>

Sean A. Woznicki, Jeremy Baynes, Stephanie Panlasigui, Megan Mehaffey, Anne Neale. 2019. Development of a spatially complete floodplain map of the conterminous United States using random forest. *Science of The Total Environment*. Vol 647, Pages 942-953

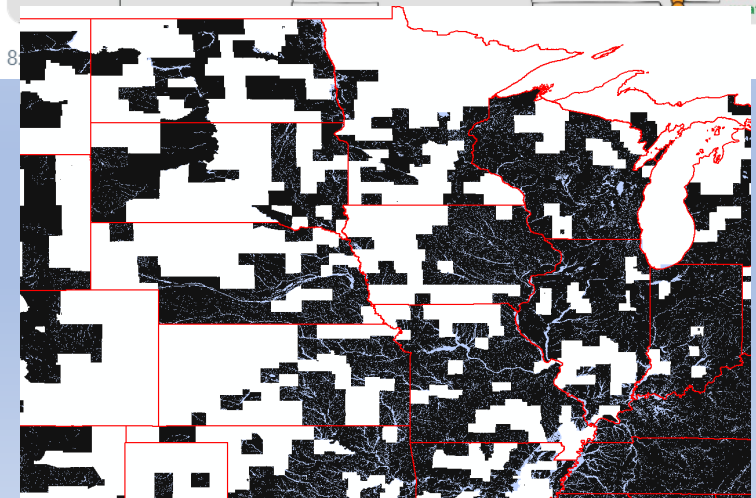
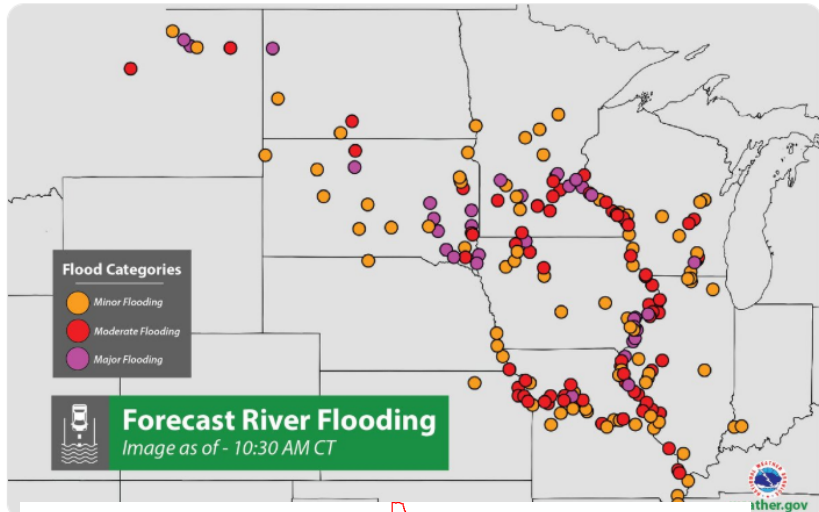


NWS  
@NWS

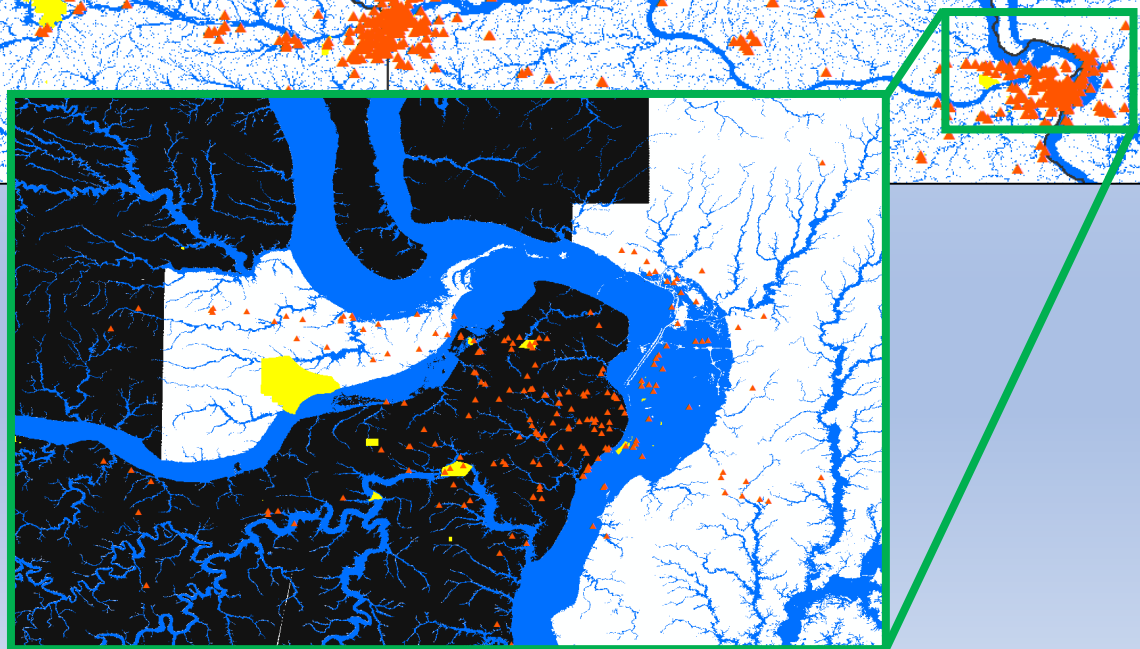
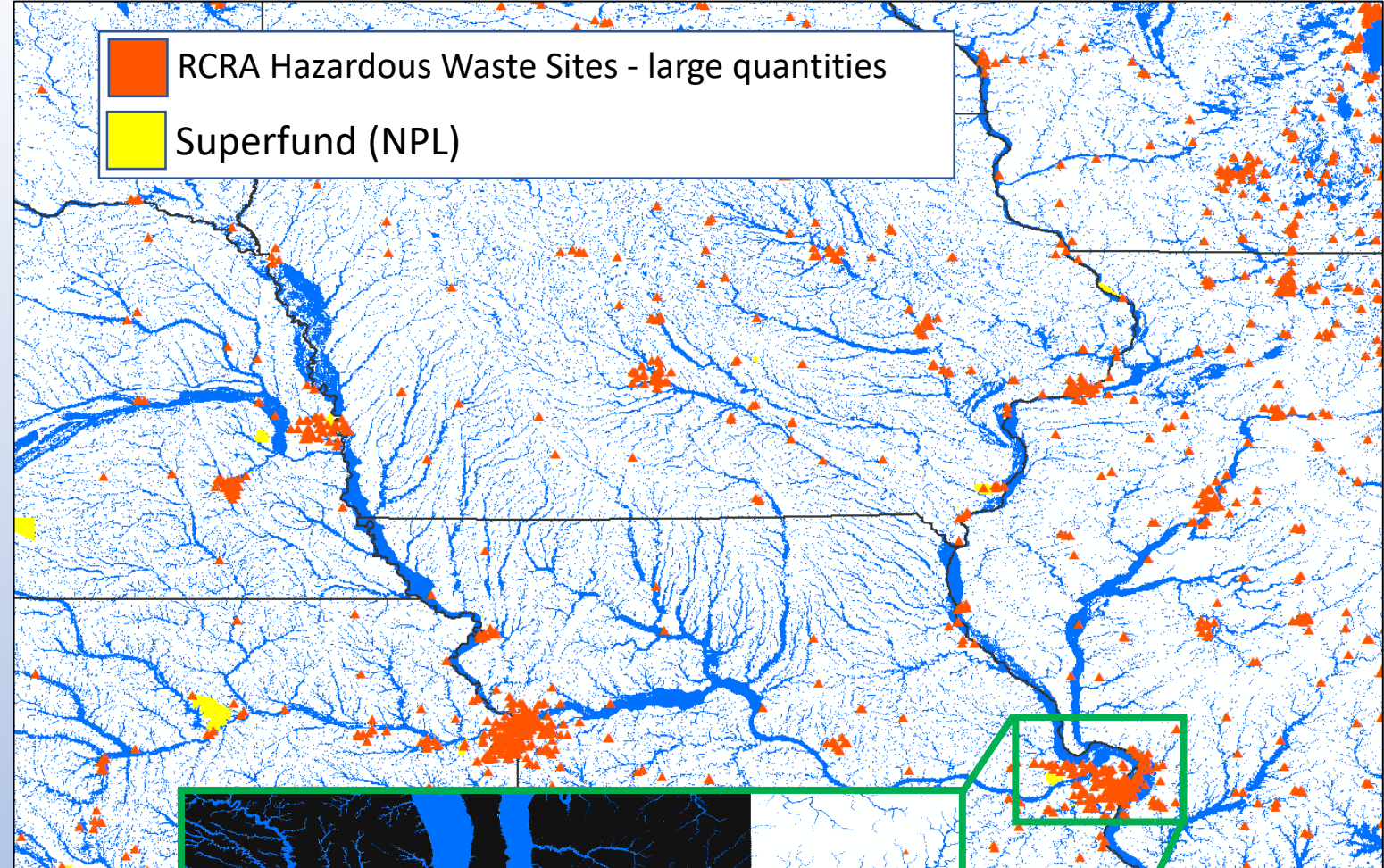
Follow



Major river flooding will continue across parts of the Mississippi and Missouri River Basins. The combination of snow melt and additional rainfall will lead to rising rivers in some locations this week. For the latest river flood forecasts visit: [water.weather.gov/ahps/](https://water.weather.gov/ahps/)



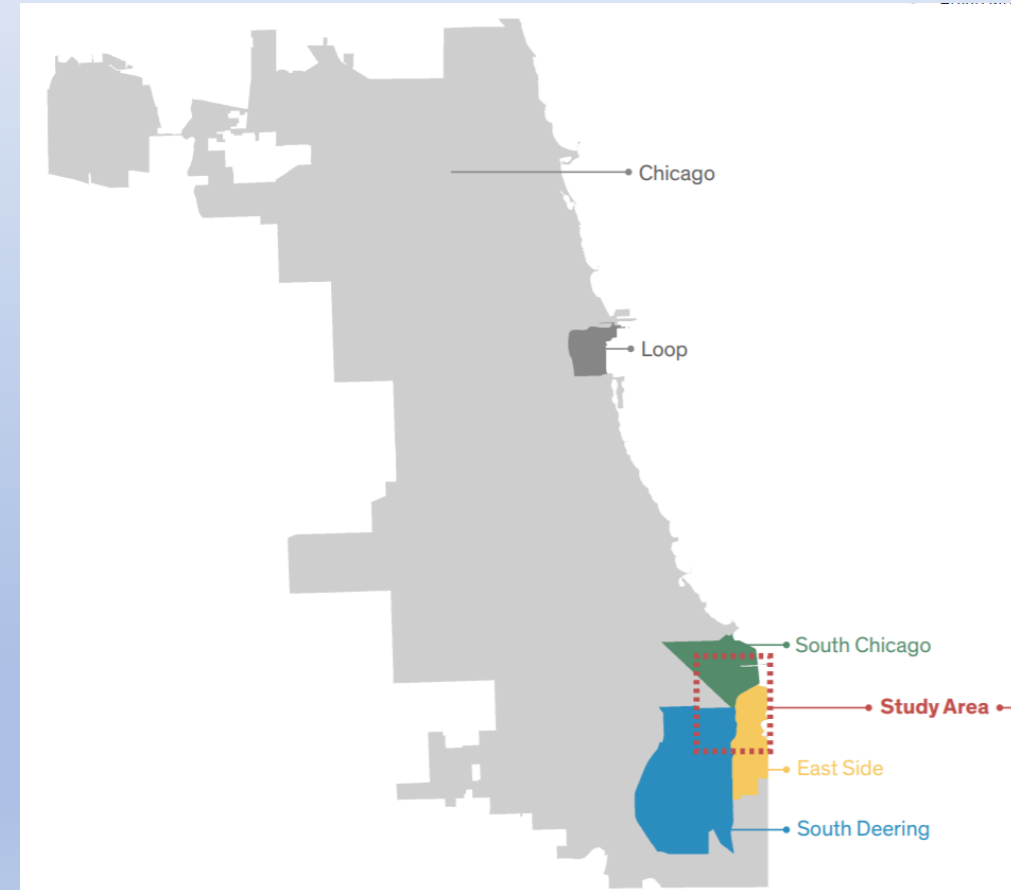
■ FEMA Coverage  
□ No FEMA Coverage



# Calumet River Communities Planning Framework

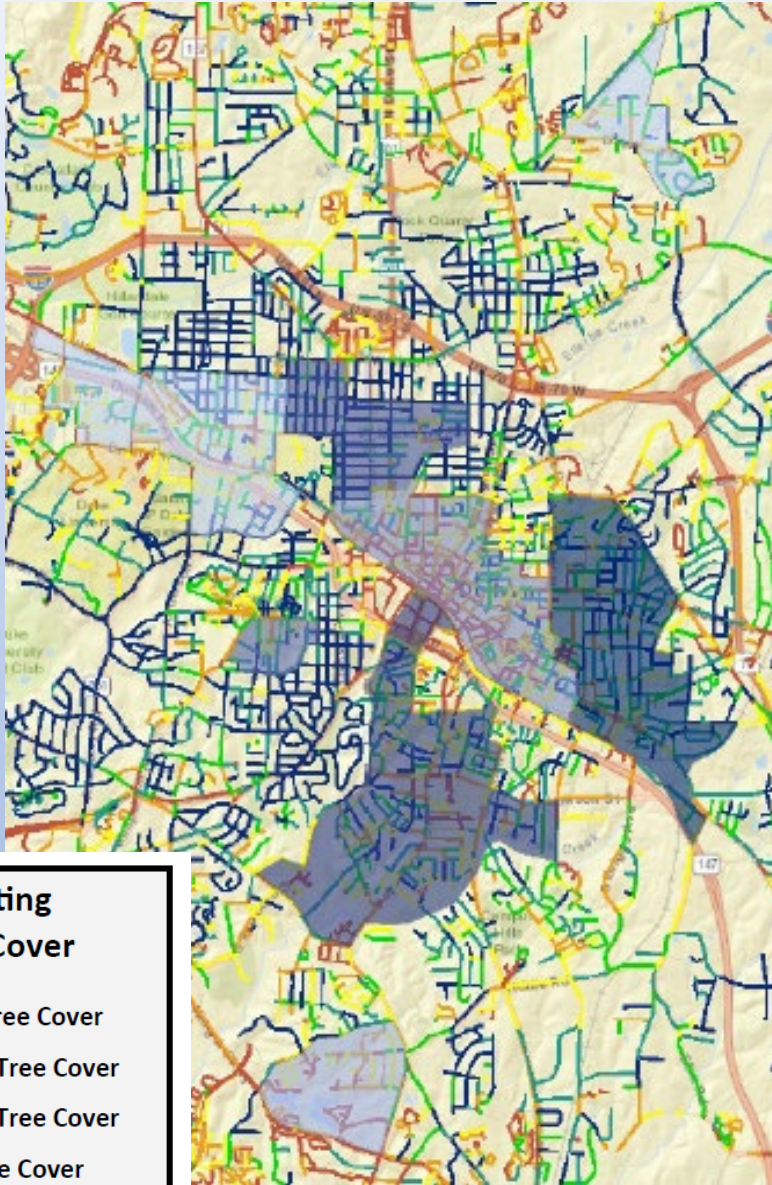
## South Chicago, East Side, South Deering | A Guide for Equitable Development

- Provides a framework for future planning efforts in Southeast Chicago and serves as a resources guide...“to better coordinate efforts and share resources to improve the quality of life for all residents”
- Uses EnviroAtlas-hosted regulated facilities data on hazardous waste sites, Superfund sites and Brownfields
- Topics covered: social equity, economic development, populations, commute modes, access to green amenities \*



\* EnviroAtlas provides data that can help communities conduct similar analyses and consider each of these topics

# Maximizing the Benefits of Tree Planting in Durham, NC



- At the City of Durham’s request, EPA researchers conducted an analysis of Durham neighborhoods to identify areas in which to prioritize tree planting
- Priority neighborhoods were selected and ranked according to the estimated benefits potentially generated by the planting of new trees along street rights-of-ways
- Potential benefits were estimated according to three socioeconomic goals:
  - Improving walkability along sidewalks and neighborhood streets
  - Reducing air pollution from car traffic
  - Targeting benefits to disadvantaged or vulnerable populations

**The City of Durham has implemented a 7-year plan to plant 10,000 trees in priority neighborhoods.**

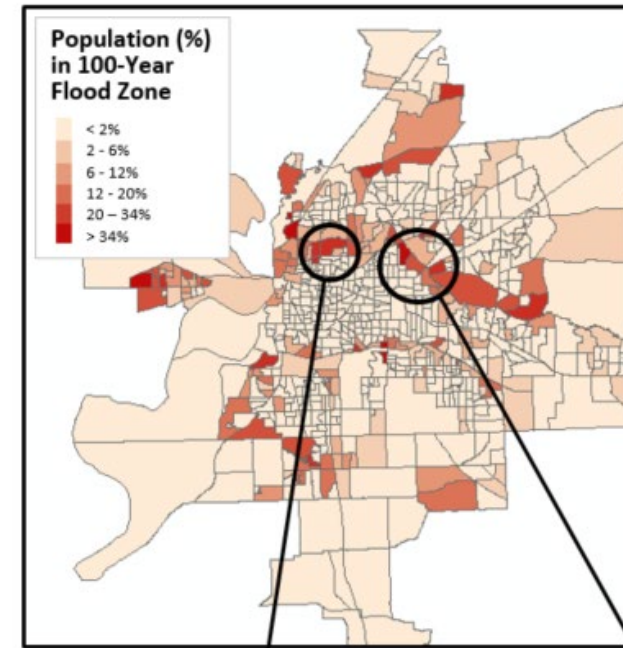
# Inland Port Community Resilience Roadmap

## Memphis, TN EPA Region 4

- Roadmap providing “actionable information and steps for local governments and port and community stakeholders to increase their resilience to the variability of river water levels.”
- EnviroAtlas highlighted as a tool with a wealth of data to help communities consider potential risks to ecosystems and human health
- For example:
  - Understanding where populations may be in the 100 year flood zone
  - Identifying particularly vulnerable populations in high risk areas
  - Pulling in community data such as Place of Worship to identify potential gathering spaces
  - Identifying lands that could be restored to back to wetlands in order to help mitigate flooding extent and duration

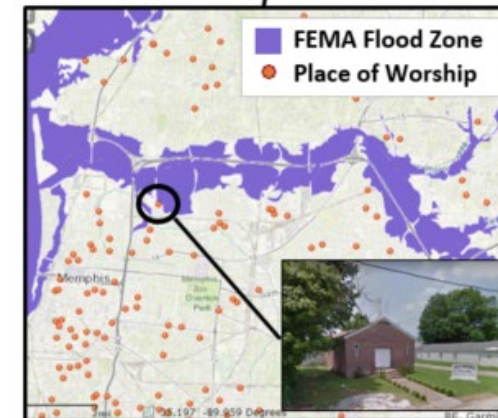
## Appendix B: EnviroAtlas

### Assessing flood risk and mitigating its impact

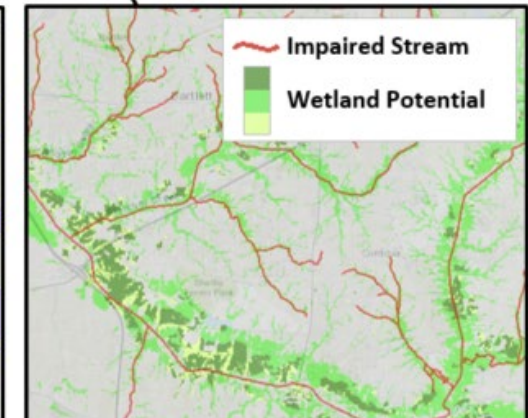


High water events in major rivers cause flooding at ports and in port communities by causing back-ups in tributary streams and rivers. It is essential for port communities to assess regions susceptible to flooding so that preventative measures may be enacted both to mitigate potential damage and to identify the likely location of populations especially vulnerable to extreme flood events for assistance or evacuation.

EnviroAtlas has recently developed maps that help identify populations and infrastructure likely to experience flood damage during 100 and 500-year floods. These maps allow users to target, for example, neighborhoods with dense populations living in the 100-year flood zone (left panel).



Available local data can be used in the EnviroAtlas interactive map to help identify potential gathering spaces of flood victims to help target relief efforts.

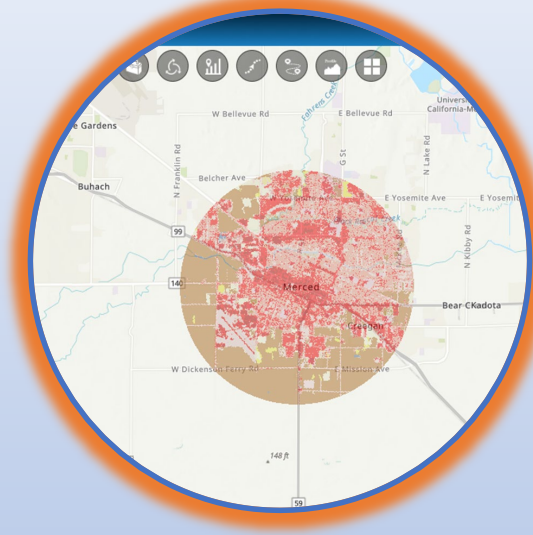






Restoring lands back to wetlands helps mitigate flooding extent and duration, while also benefiting the water quality of local impaired streams.

# EnviroAtlas Tools – Coming Soon

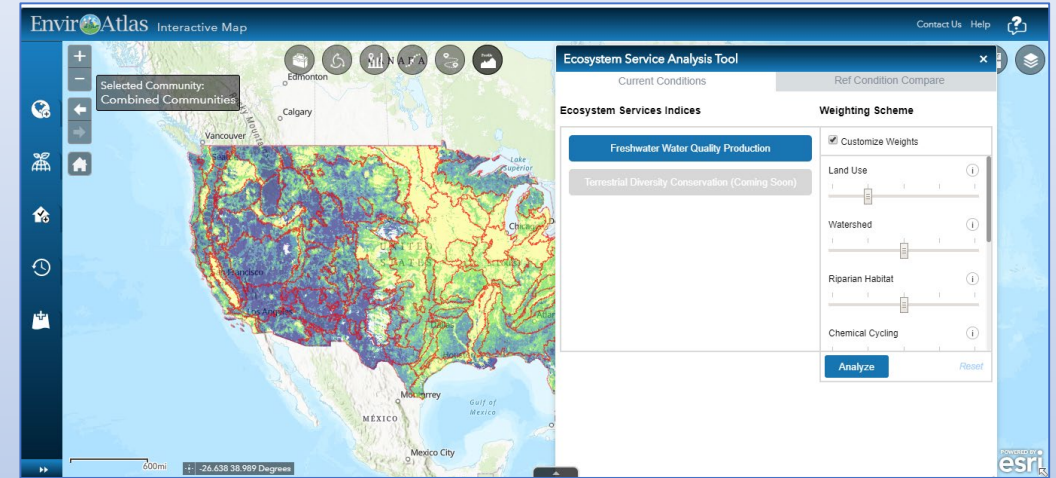
## Gridded Analysis Tool

- User can select watershed, county, congressional district
  - or create a varying-size circular buffer around a selected point
  - or draw a custom area
- Can then calculate land cover proportions for area selected
- Will be expanded to include other calculations in addition to land cover



Gridded Map Tool	
Select Area and Layer	Results
Draw Type	Buffer Distance
User Point	3.5 m
Attribute	Value
Area of Selection:	38 m2
Percent NLCD Developed	64.59 %  <a href="#">View Full Legend</a>
Percent NLCD Greenspace	2.79 %  <a href="#">View Full Legend</a>
Percent NLCD Agriculture	32.38 %  <a href="#">View Full Legend</a>
Percent NLCD Water	0.24 %  <a href="#">View Full Legend</a>

## Screen and Prioritize Index Tool



- User can combine metrics to create screening or prioritization score for targeted questions
- First example will be related to provision of clean water
- User will be able to adjust importance of each element

# Conclusion

- **EnviroAtlas** is a powerful, robust, online resource (that's free!).
- We have interactive tools and a wealth of data that you can use to explore your community environment.
- We have guides and tutorials that you can use if you need them.
- We hope you feel more confident using EnviroAtlas!

# Contact Us

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