EPA United States Environmental Protection Agency

Exploring Real-world Applications of EnviroAtlas

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U.S. EPA Office of Research and Development

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Outline

- Brief EnviroAtlas introduction
- What is new since the 2016 EnviroAtlas webinar
  - Live demo
- How is EnviroAtlas being used in the real world

EnviroAtlas Introduction

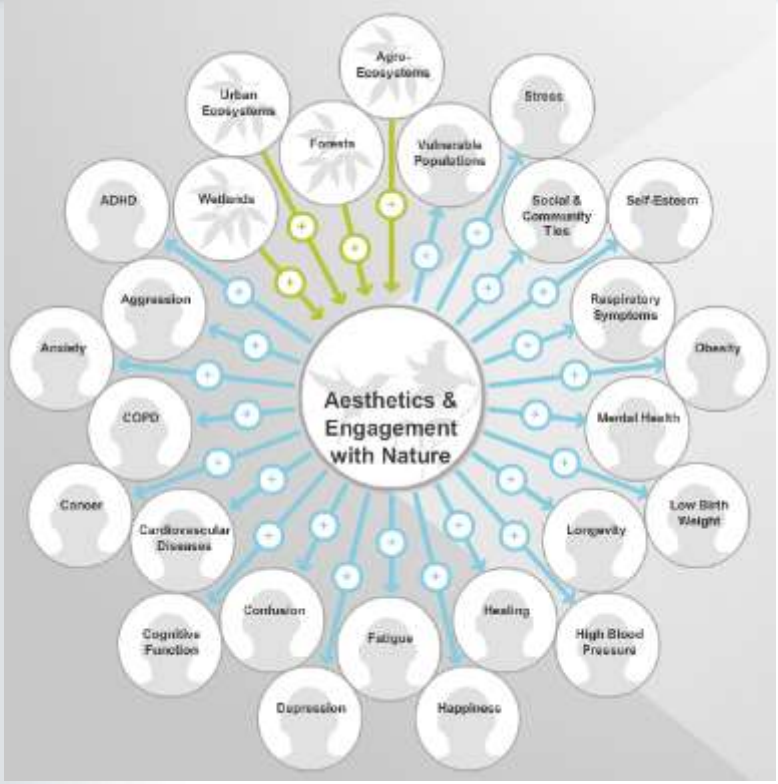
- Free
- Web-based
- Easy to use
- No technical skills required

www.epa.gov/enviroatlas

Nature's Benefits (Ecosystem Goods and Services) Categories

- Clean Air
- Clean & Plentiful Water
- Biodiversity Conservation
- Food, Fuel & Materials
- Natural Hazard Mitigation
- Climate Stabilization
- Recreation, Culture & Aesthetics

Eco-Health Relationship Browser



Evidence-based associations

500+ scientific articles

4 Ecosystems:

- Forests
- Urban ecosystems
- Wetlands
- Agro-ecosystems

6 Ecosystem Services:

Health promotional services

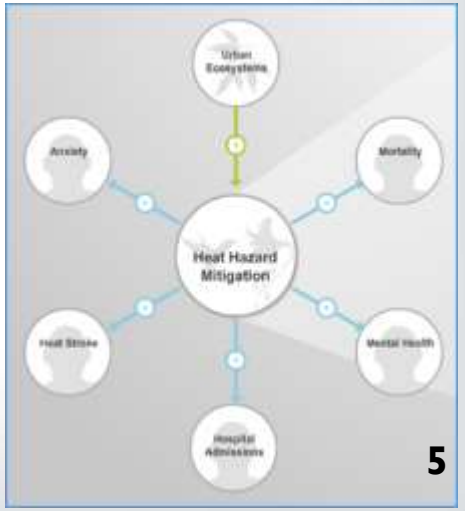
- Aesthetics & Engagement with Nature
- Recreation & Physical Activity

Buffering services

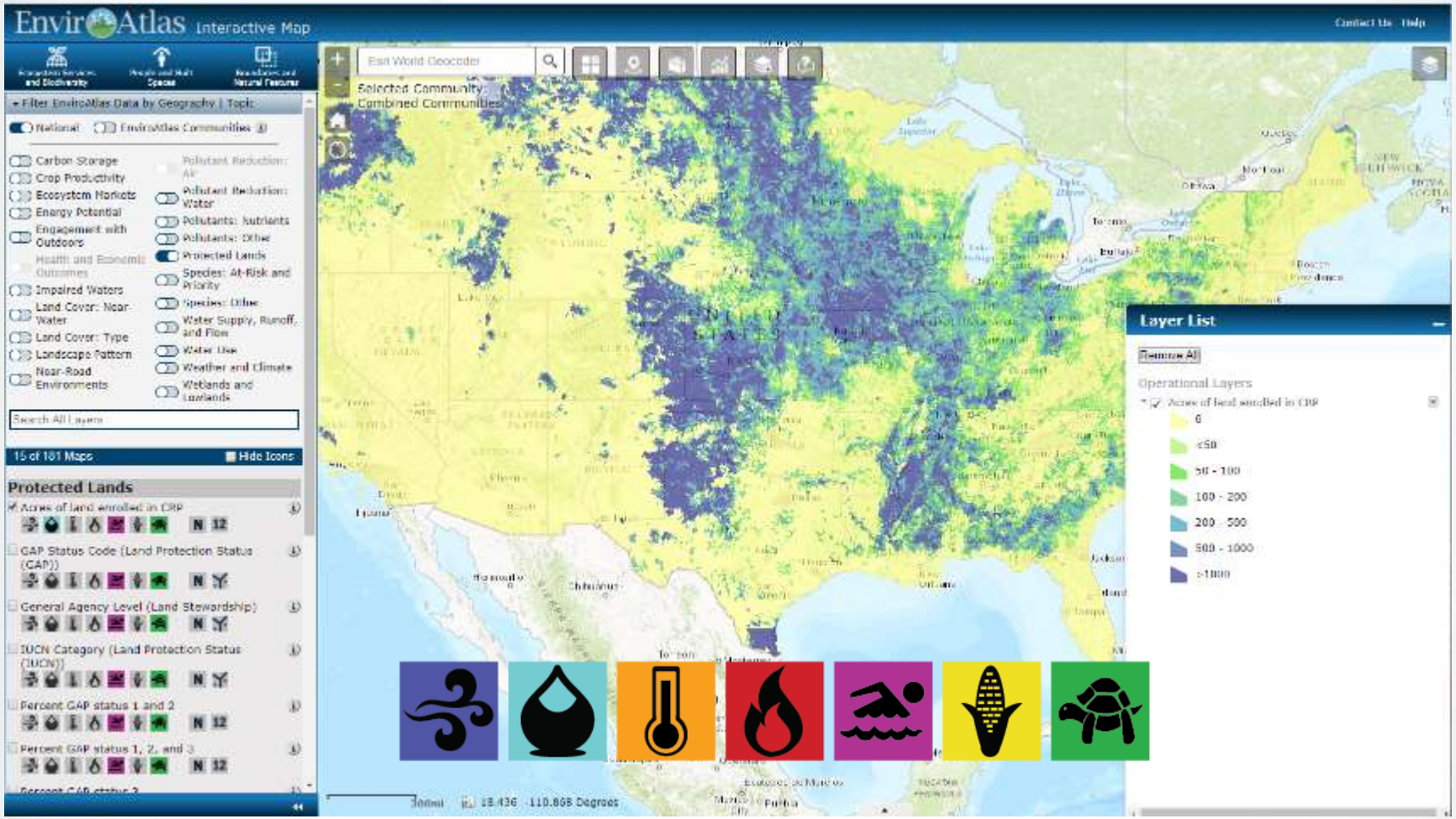
- Air Quality
- Water Quality
- Heat Hazard Mitigation
- Water Hazard Mitigation

30+ Health Outcomes:

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



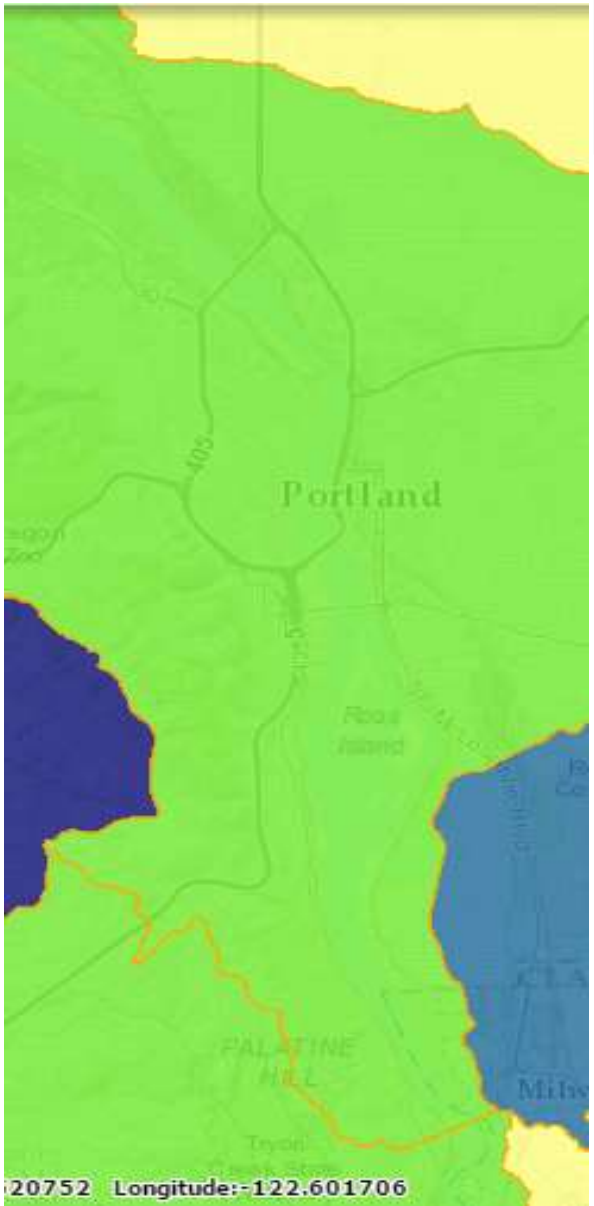
Interactive Map



300+ indicators of Ecosystem Goods and Services
Demographic and supplemental data

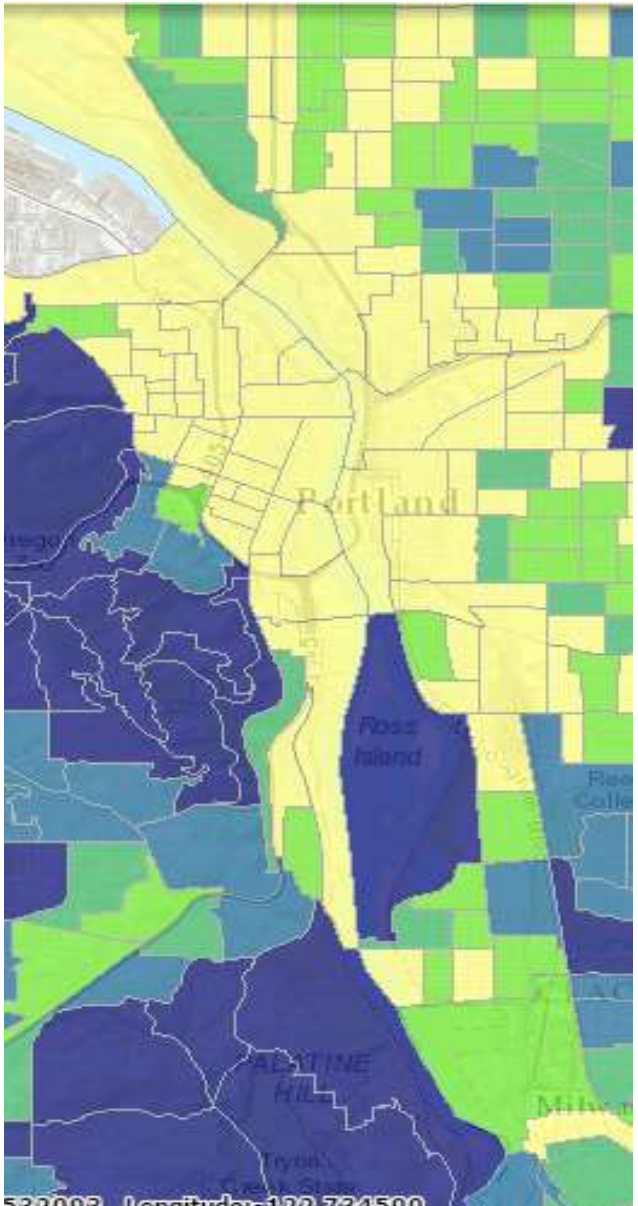
National

Subwatershed
(12-digit HUC)



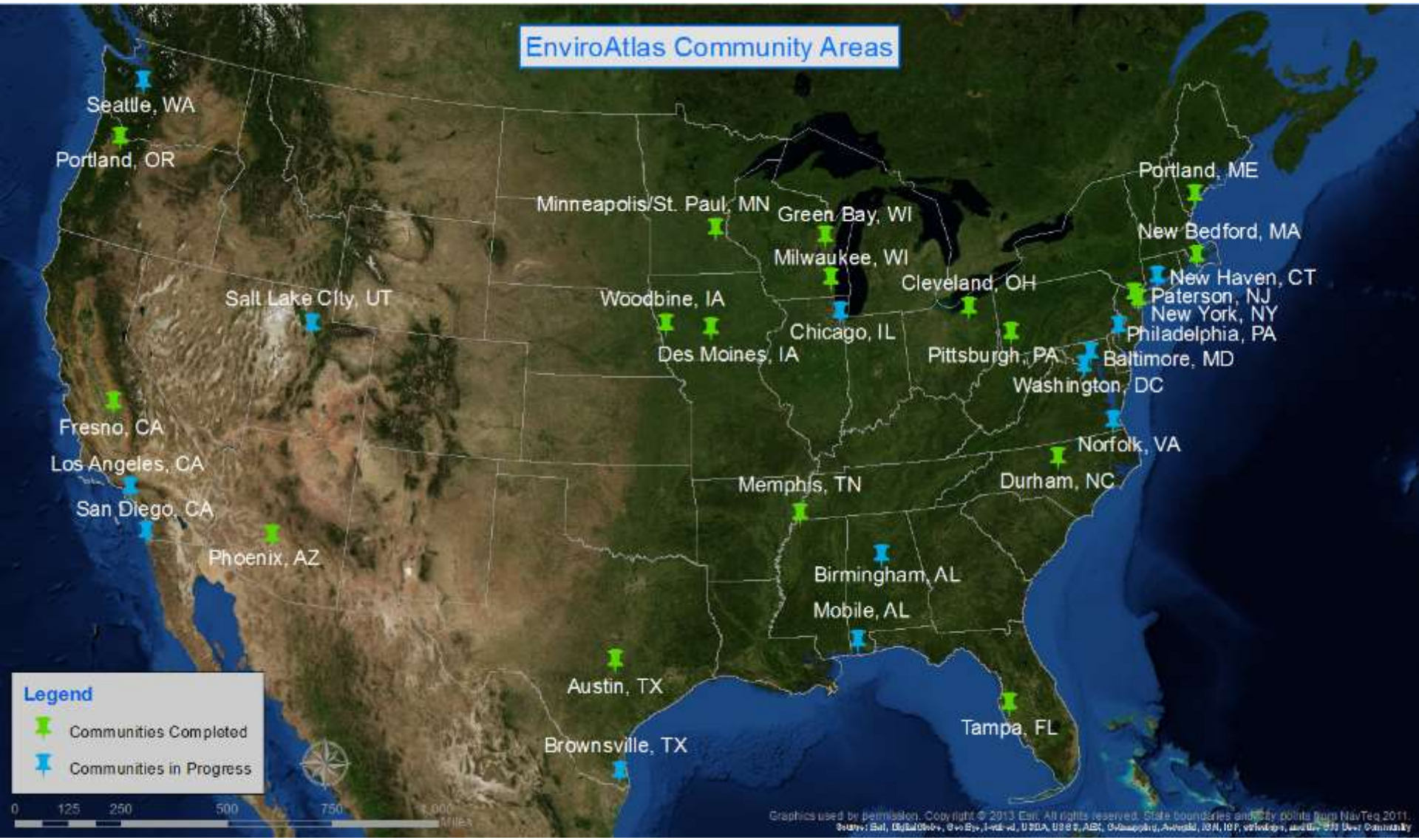
Community

Census Block Group



+ Non-summarized

EnviroAtlas Featured Communities



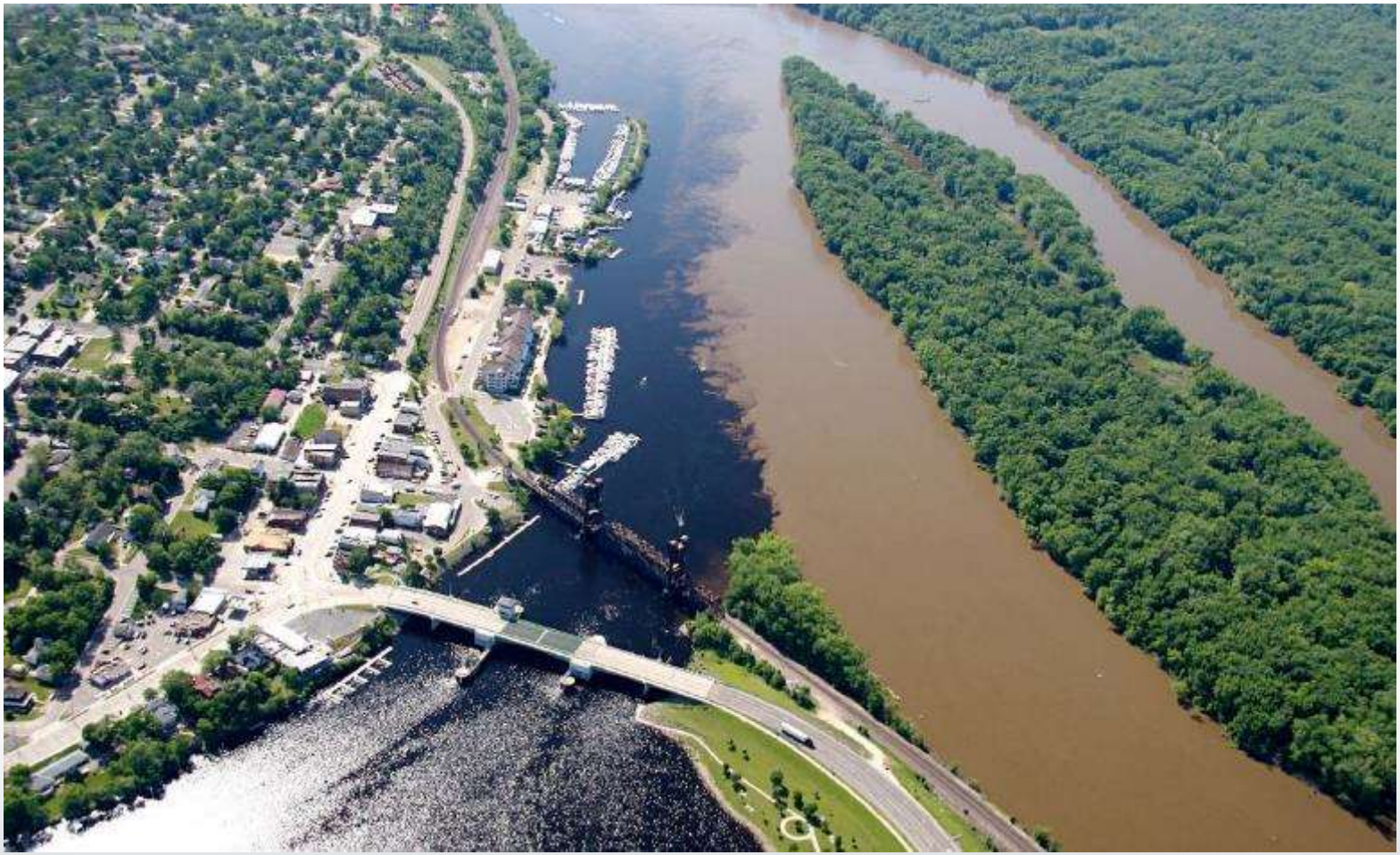
What is New in EnviroAtlas

- New and improved Interactive Map
- Guide for using EnviroAtlas data in a Health Impact Assessment
- New Use Cases
- K-12+ Lesson Plans
- Eco-Health Relationship Browser literature update – 2013 & 2014
- New Data
- New Communities
- New Tools
- Dynamic Data Matrix


Demonstration
www.epa.gov/enviroatlas

Linking Minnesota Land Cover Changes to Potential Drinking Water Treatment Challenges

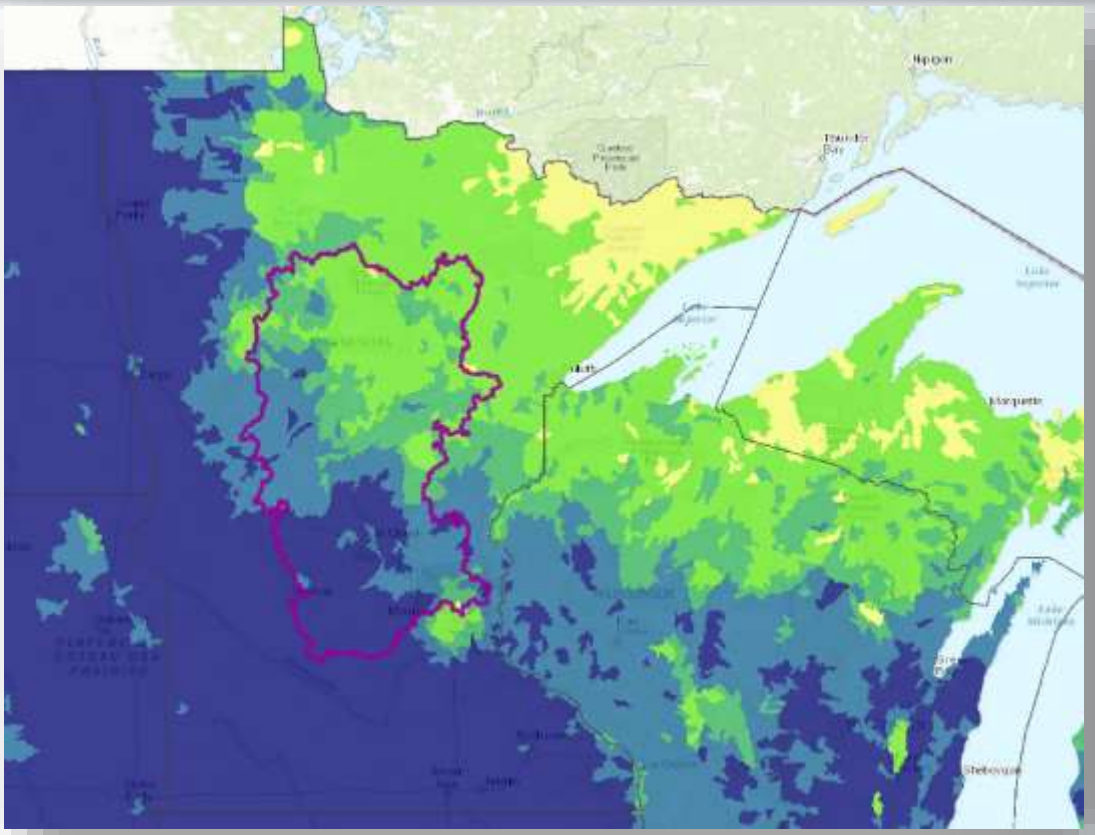
Concerns: Drinking water quality, pressure on the drinking water system and treatment



Linking Minnesota Land Cover Changes to Potential Drinking Water Treatment Challenges

Process: Model land cover changes, assess impact on water quality.

Outcomes: Understand ecosystem health and stressors, anticipate future changes, adjust drinking water treatment options.



Screenshot from the EnviroAtlas Interactive Map showing Synthetic Nitrogen Fertilizer Application (kg N/ha/yr)

Work ongoing with EPA ORD researchers and MN Dept. of Health; St. Paul Regional Water Services, City of St. Cloud, City of Minneapolis, Nature Conservancy, USGS, UMSWPP

Using EnviroAtlas in Health Impact Assessment - Tampa, Hillsborough County, FL

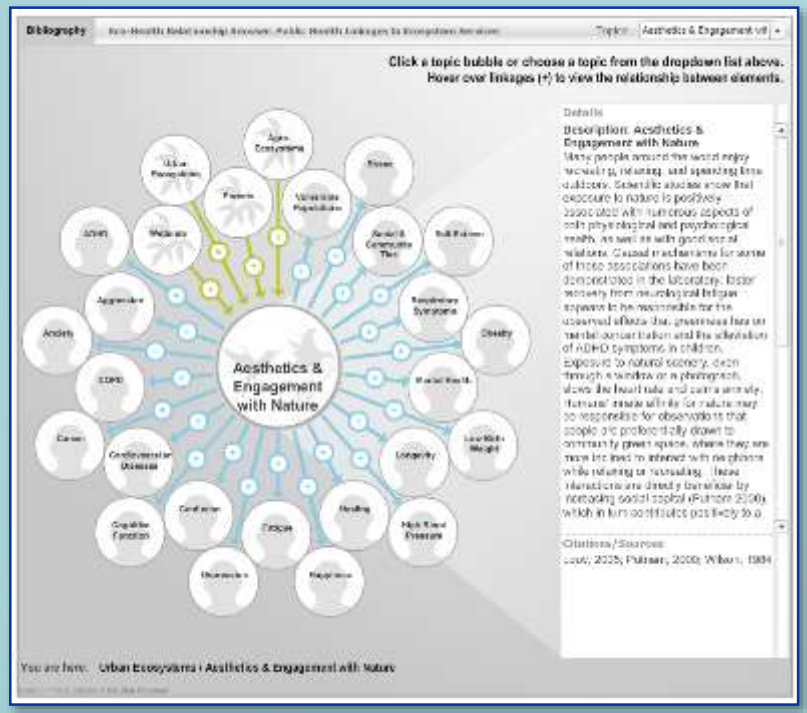
www.tampagov.net

Using EnviroAtlas in Health Impact Assessment - Tampa, Hillsborough County, FL

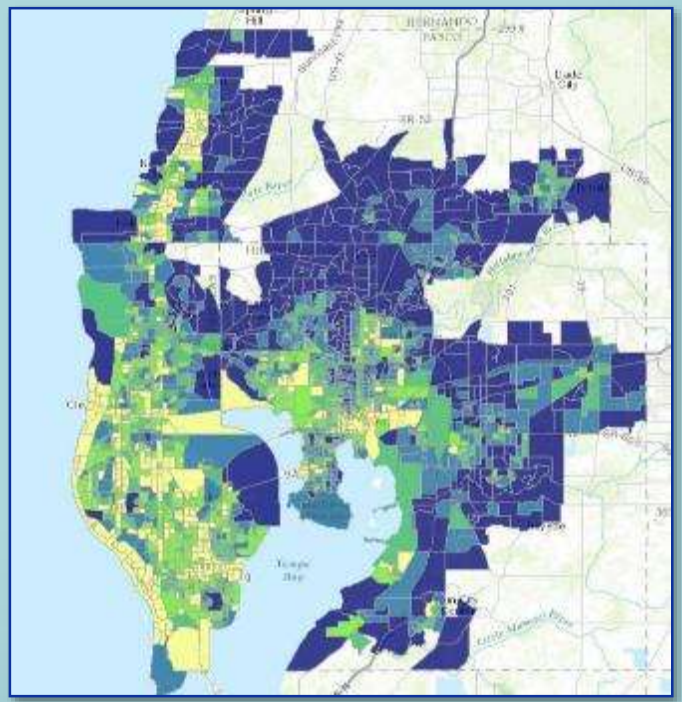
"This data was helpful in determining the impact predictions for the project, in particular the impact of exposure to green space for residents and trail users."

—Florida Department of Health in Hillsborough County, Office of Health Equity

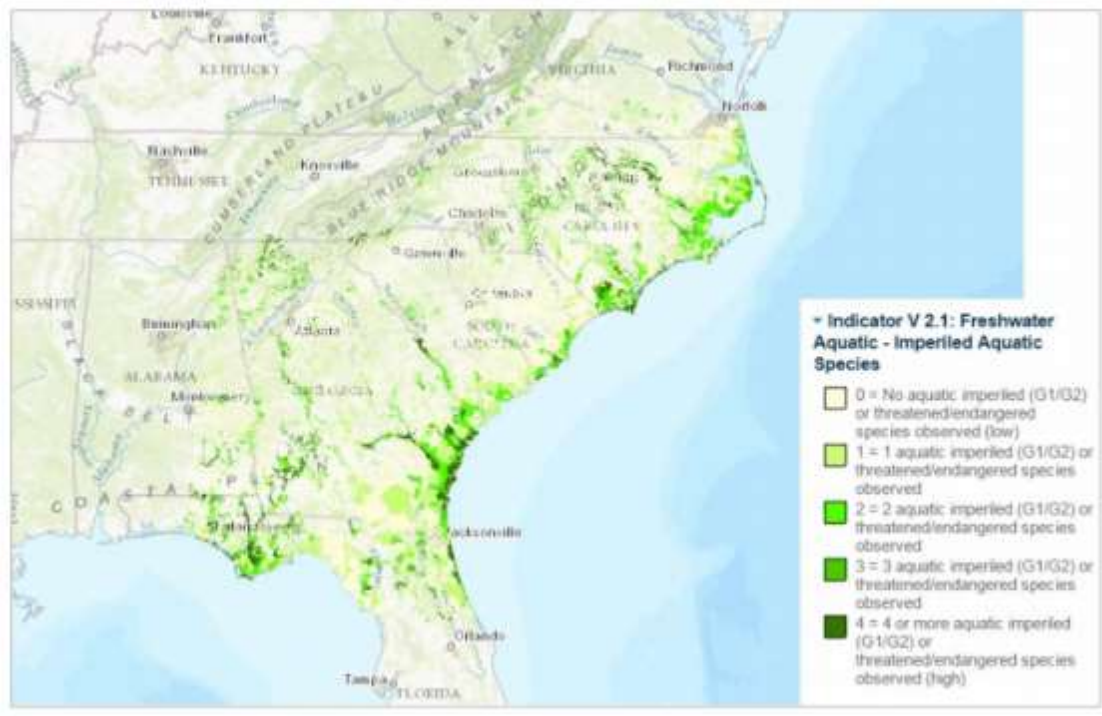
Eco-Health Relationship Browser



Geospatial Data: Percent Green Space by block group

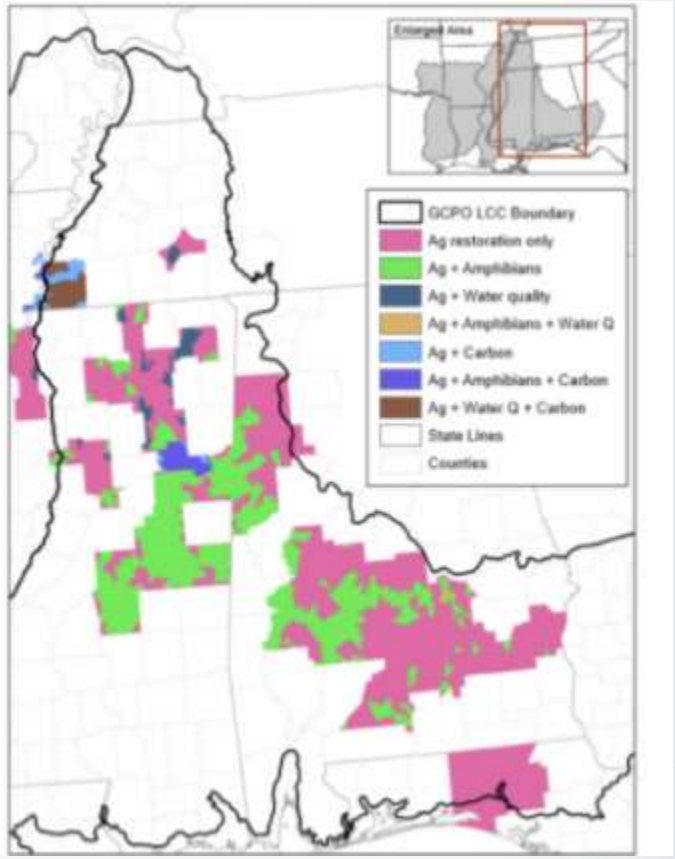


Landscape Conservation Cooperatives Use EnviroAtlas for Regional Assessments



Screenshot from the SALCC Blueprint showing Imperiled Aquatic Species

Gulf Coastal Plains & Ozarks LCC



Each color represents a different combination of prioritized ecosystem services for restoring habitats

Prioritizing Watersheds for Cleanup and Restoration

Issue: The U.S. has thousands of Clean Water Act Section 303d "impaired waters" across the nation.

Concern: Challenging for states to prioritize watersheds for restoration.

Process: Use EnviroAtlas data in Recovery Potential Screening (RPS) tools to prioritize watersheds for likelihood of restoration success and recovery.

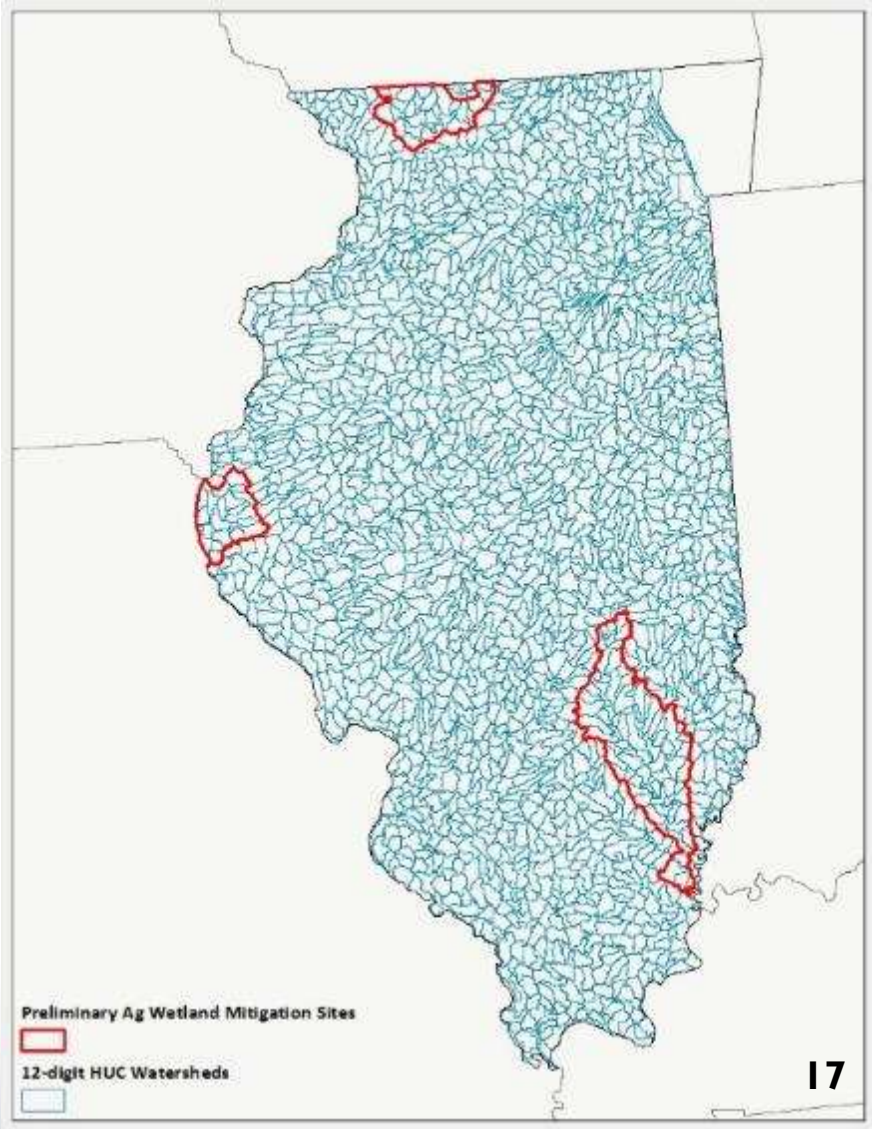
Outcomes: Wise use of resources.

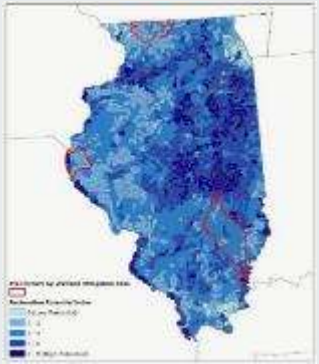
Screenshot from the EnviroAtlas Interactive Map showing Stream Length Impaired by Pathogens (km) zoomed in to Connecticut

RPS users have included over 20 state water quality programs, local watershed groups, river basin managers, tribes and federal agencies.

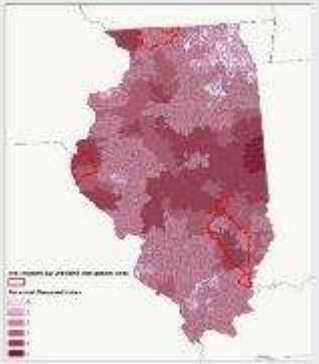
Ecosystem Markets: Evaluating sites for an agricultural wetlands mitigation bank in Illinois

- ✓ **Restoration potential**: Where are restoration efforts most likely to result in healthy wetlands?
- ✓ **Presence of demand**: Demand is anticipated to come from farmers seeking to convert wetlands to agricultural use. Where have there been many wetland determination requests? Are there other agricultural wetland mitigation providers in the vicinity?
- ✓ **Co-benefits**: What other ecosystem services could be protected/enhanced on the site in question?

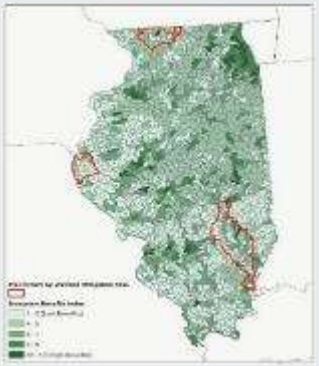




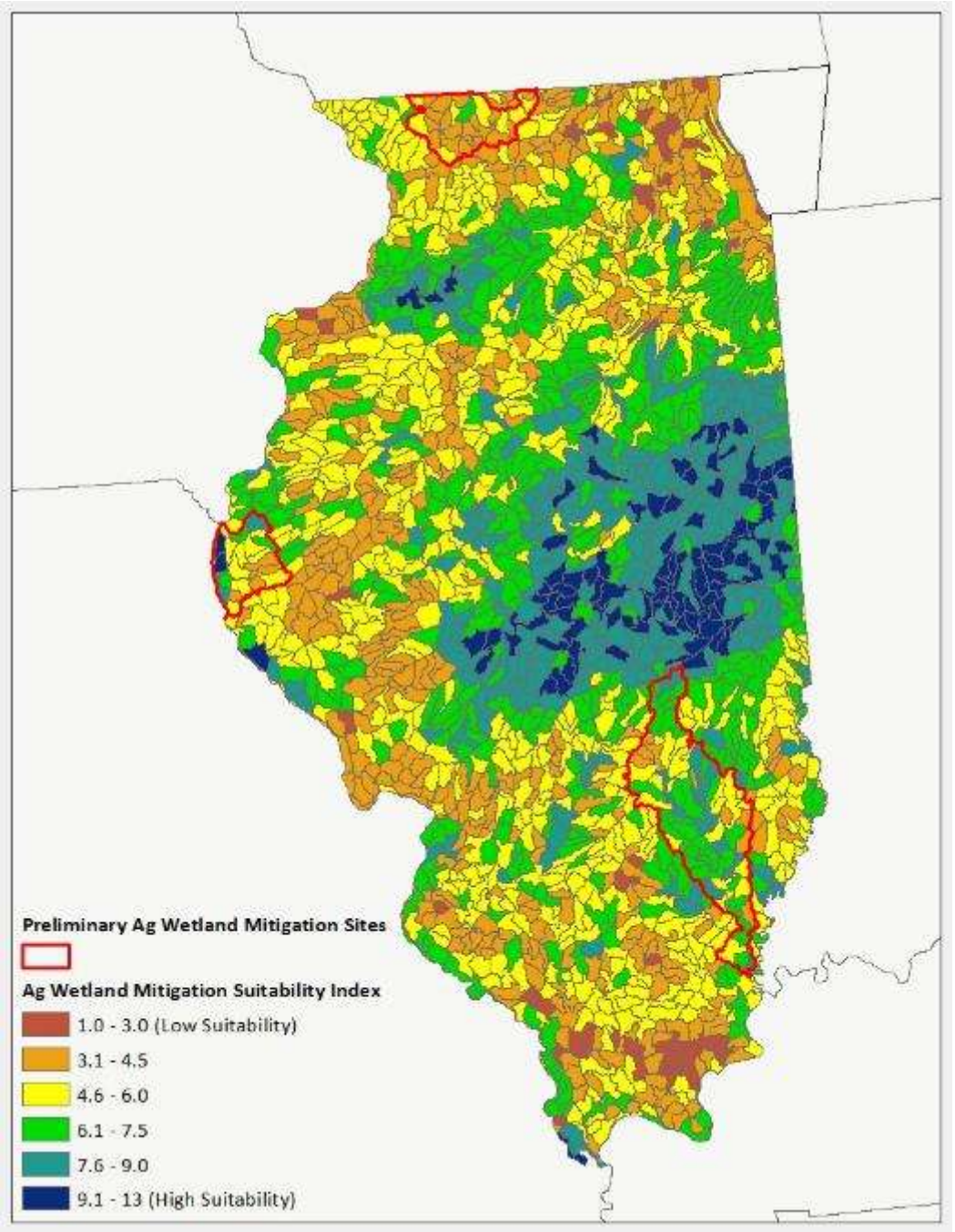
Index: Wetland restoration potential



Index: Potential demand for credits



Index: Potential ecosystem services co-benefits



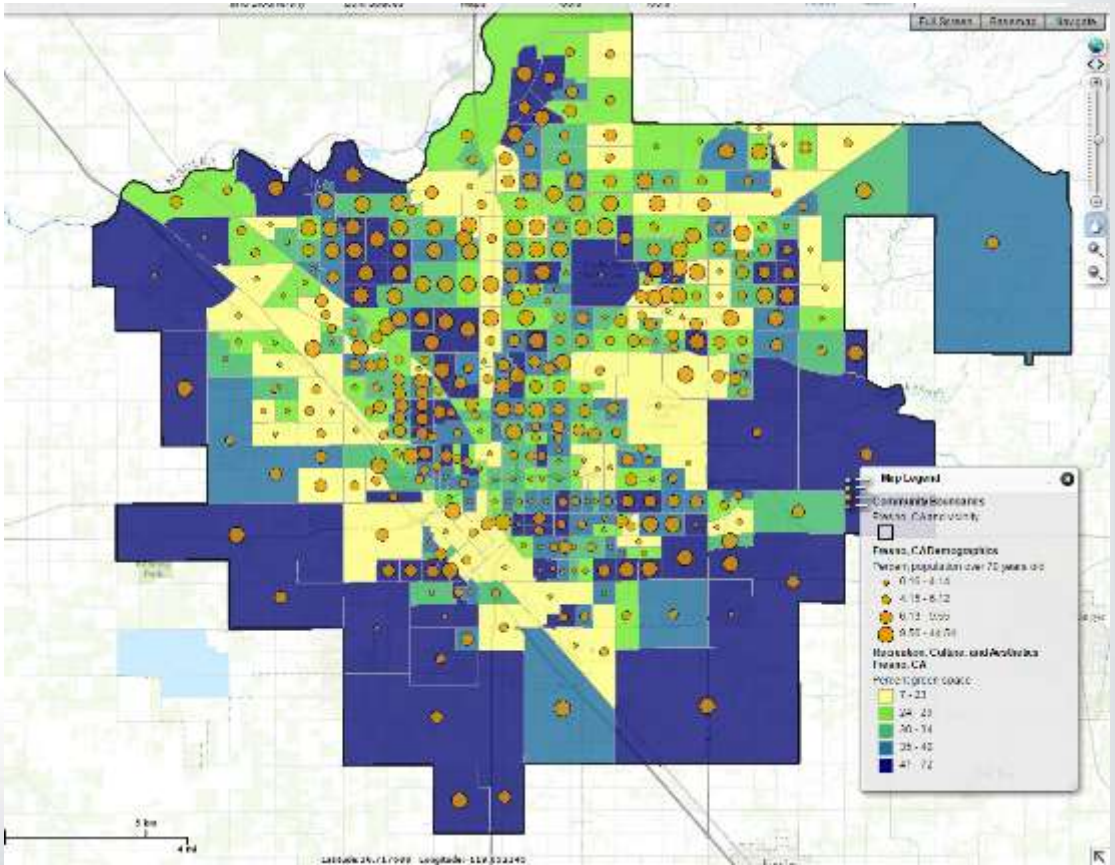
MULTI-FACTOR INDEX: AGRICULTURAL WETLAND MITIGATION SITE SUITABILITY

Green Space - Fresno, CA

- **City of Fresno Parks, After School, Recreation and Community Services (PARCS) Department used EnviroAtlas data to support application for a California State Grant**
- **Were awarded funding to increase green space and plant trees**

Image: Percent green space in Fresno, CA

Overlaid: Percent population over 70 years old



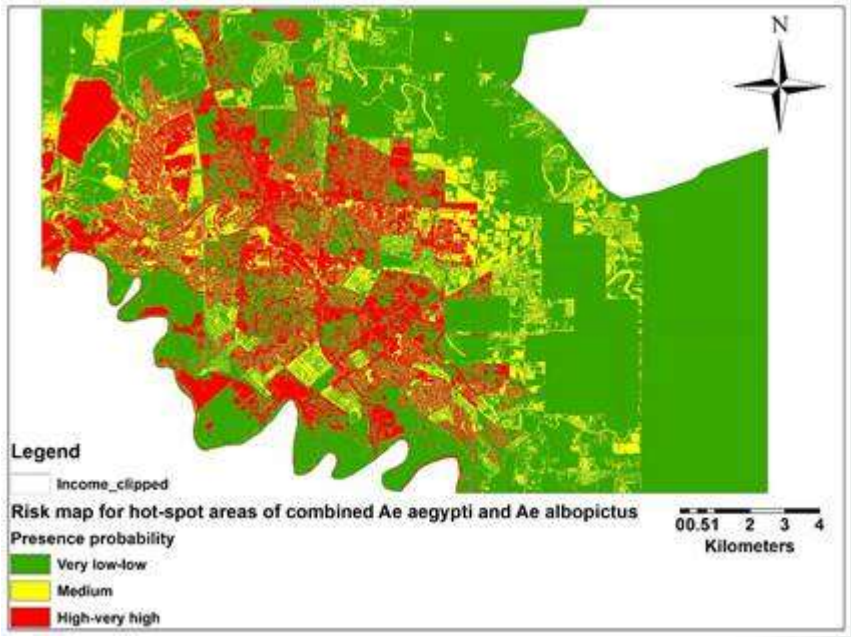
Reducing Zika Disease Risks through Integrated Vector Management

Issue: In Nov 2016, Brownsville, TX became the second location in the U.S. to report a locally-acquired case of the Zika virus.

Concern: Difficult to maximize pesticide effectiveness and minimize human health exposure.

Process: EPA working with city of Brownsville to incorporate EnviroAtlas data layers in models to identify Zika vector hotspots.

Outcomes: Wise use of mosquito control resources.



Preliminary Risk Map for Zika vectors, *Aedes aegypti* and *albopictus,* City of Brownsville, TX

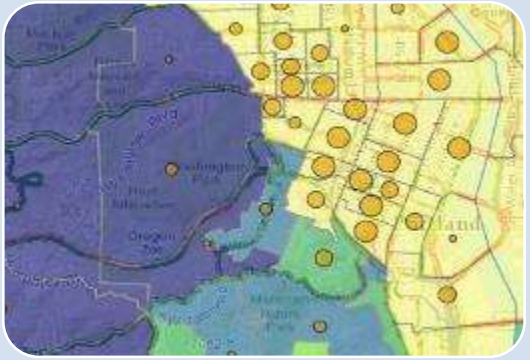
Eco-Health Studies

EnviroAtlas is being used extensively in studies investigating linkages between ecosystem services and human health outcomes.

Examples:

- A. I. Egorov et al. 2017. Vegetated land cover near residence is associated with reduced allostatic load and improved biomarkers of neuroendocrine, metabolic and immune functions, *Environmental Research.*
- J. Wu and L. Jackson. 2017. Inverse relationship between urban green space and childhood autism in California elementary school districts. *Environment International.*
- L. Cusack et al. 2017. Associations between multiple green space measures and birth weight across two US cities. *Health & Place.*
- V.L. Jennings et al. 2016. Ecosystem Services and Preventive Medicine, a Natural Connection. *American Journal of Preventive Medicine*.
- R. Silva et al. 2017. Assessing the Effect of the Natural Environment on Subjective Well-being. Presented at International Society of Exposure Science Annual Meeting.

EnviroAtlas Educational Curriculum



K-6

Exploring Your Watershed

Coming soon online!

7-12+

Connecting ecosystems and human health

Available online!

9-12+

Building a Greenway: Case Study

Available online!

Align with NGSS; Individual State Science Standards in Appendix of every lesson

Analysis of Data Downloaders Responses when Asked How they will use EnviroAtlas Data

Examples of how State/Local Government Intend to use the data

- **East-West Gateway Council of Governments, St. Louis, MO** – "Long term goal to support land use decisions. Near term we are collecting and assembling a data repository of biodiversity, natural resource, etc. data. One of our goal deliverables is a regional comprehensive biodiversity plan."
- **Southwest Michigan Regional Planning Commission** – "…The data will be used in reports for watershed management, transportation and health impact assessments."
- **Nevada DOT** – "Assessing potential impacts from highway runoff to water quality and sensitive habitats."
- **Oregon DEQ** – "To enhance water quality."
- **Washington State Voluntary Stewardship Program** – "We are working on identifying the baseline agricultural economy in Thurston County to inform what our needs are, and what areas of the industry need support, can expand, etc."
- **Cleveland, OH** – "For conservation planning and evaluation of carbon credit program participation."

Examples of how Researchers/NGOs Intend to use the data

Researchers

- “We are currently working on an environmental justice mapping project that centers around risks to populations living in manufactured housing in the US.”
- “To compare and contrast patterns of urban development, socio-demographics and ecosystem services.”
- “For research into the public health effects of vegetation, particularly focused on trees.”

Non-Government Officials

- “Regional/landscape-level spatial analysis for species distribution modeling.”
- “U.S.-wide ecosystem service analysis, landscape conservation.”
- “In studies to determine high areas of interest for preservation and creating parks and trails.”

For More Information

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EnviroAtlas is the product of US EPA and multiple partners

US Geological Survey
US Dept of Agriculture
+ NGOs and Universities