

Using *EnviroAtlas* to give future designers a spatial sense of sustainability

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A scientist among creatives



I have taught courses in:

- ★ Ecology
- ★ Ecology for Architects
- ★ Evolution
- ★ The Evolution of Cooperation
- ★ The Evolution of Sex
- ★ The Evolution of Play
- ★ Behavioral Ecology
- ★ Human Evolution

Pratt

*School of Liberal Arts & Sciences
Department of Mathematics & Science*

The context:

A required course for the Minor in Sustainability Studies



ONLY YOU



Can Prevent Unsustainability.

Pratt Envirolutions is investigating student life and campus facilities to determine where our energy use could be improved. We will be advocating for better energy practices and working to reduce Pratt's carbon footprint.

Please help by sending your observations of unsustainability on campus!

PRATT ENVIROLUTIONS

prattenviro
prattenvirolutions.org

ROOM FOR IMPROVEMENT



The challenge:

Ecological phenomena span great scales of time and space



The activities:



Group Activity: How biodiversity impacts ecosystem services

Names of Group Members: _____

Objectives of this Activity:

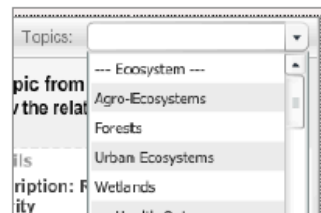
1. Explore the connection between the biodiversity of different ecosystems, various ecosystem services, and measures of human well-being.
2. Explore how regional biodiversity produces ecosystem services and how ecosystem service provision is regionally distributed.
3. Report your findings to the rest of the class.
4. Review and respond to the findings of the rest of the class.

Instructions:

1. Technically, your group only needs one computer to complete this activity, but it may be helpful to have multiple computers going so that you can expand the breadth of your group's explorations. It will also be necessary to work on separate computers when you reply to the work of other groups.
2. To complete this activity, you must visit the U.S. Environmental Protection Agency's "EnviroAtlas" tool. Below is the information you need to gain access to this tool:

URL: <http://enviroatlas.epa.gov/enviroatlas>

- For the first part of this activity we will be using the “Eco-Health Browser”. You can access this tool by clicking on the middle-column link that reads “**EnviroAtlas Eco-Health Relationship Browser**”
- The introduction page for the *Eco-Health Browser* provides you with instructional text and video. Read the text and/or watch the video to familiarize yourself with how this tool works. When you have introduced yourself to the tool, click where it says “**Launch the Browser**”.
- Start exploring the connection between ecosystems, the services they provide, and measures of human well-being by navigating the “Topics” drop-down menu located in the top right corner of the *Eco-Health Browser* ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒
- Explore various ecosystems by using the interactive features of this tool to connect ecosystems to the services they provide and measures of human well-being. Notice that hitting the “+” connectors explains the science that substantiates connections depicted in the browser. Take note of any connections that are of interest to members of your



Group Activity: Pollution and the built environment

Names of Group Members: _____

Objectives of this Activity:

1. Explore the geographical relationship between various forms of pollution/pollutant effects and the built environment;
2. Explore how mapping tools can help us understand the actual or potential distribution of pollutants and their effects;
3. Find evidence for environmental injustice related to the geographical distribution of pollutants and their effects; and
4. Report your findings to the rest of the class.

Instructions:

1. This activity builds on skills learned in a previous group activity, "How biodiversity impacts ecosystem services". If you need to review these skills, download the instructions for this previous activity from the *Learning Management System (LMS)*.
2. Technically, your group only needs one computer to complete this activity, but it may be helpful to have multiple computers going so that you can expand the breadth of your group's explorations.
3. To complete this activity, you must navigate to the U.S. Environmental Protection Agency's "EnviroAtlas" tool. Below is the information you need to gain access to this tool:

URL: <http://enviroatlas.epa.gov/enviroatlas>

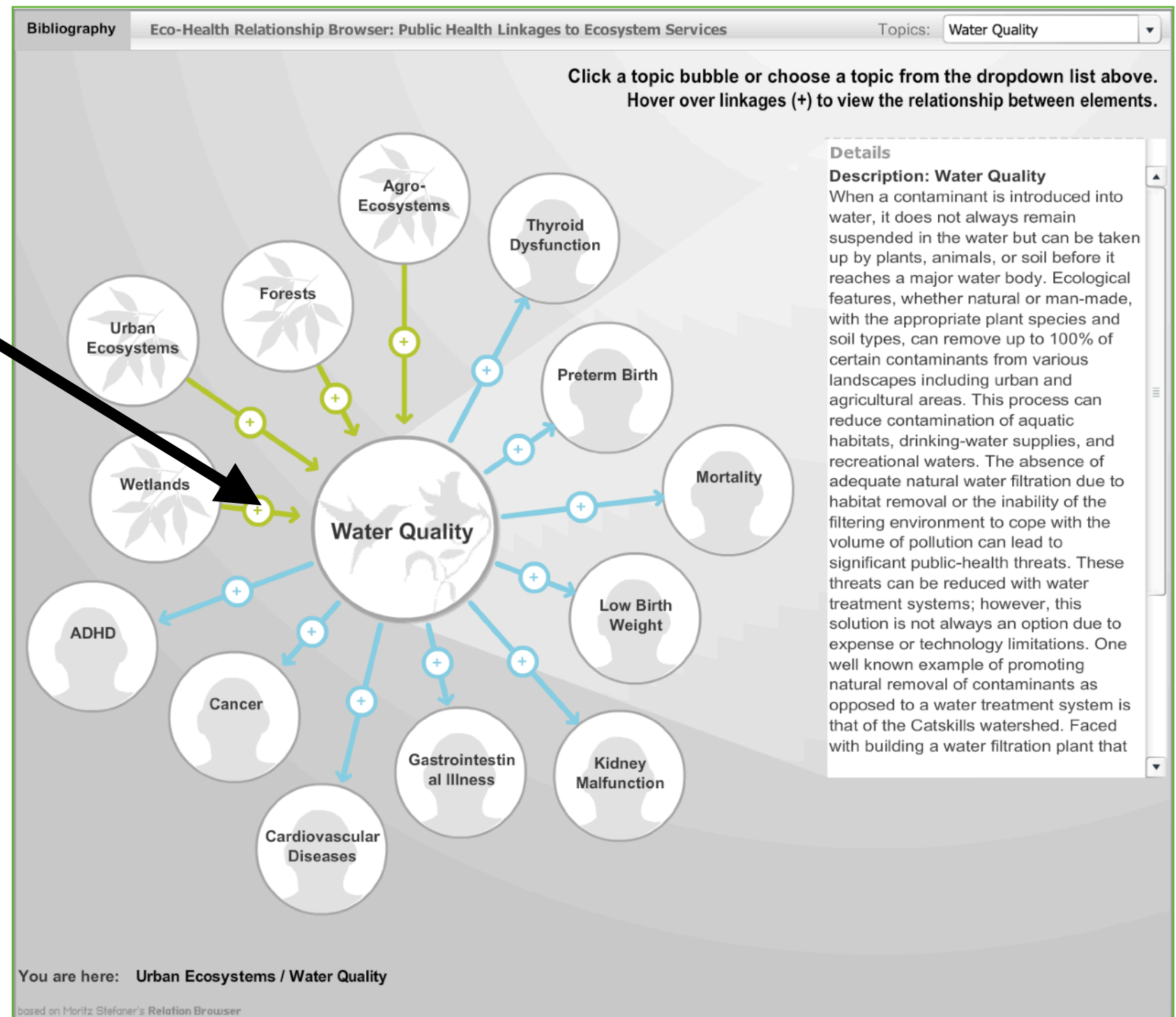
4. During this activity, we will be using EnviroAtlas’ “Interactive Map” tool. You can access this tool by returning to the *EnviroAtlas Home* page and clicking on the “**EnviroAtlas Interactive Map**” link. On the main EnviroAtlas page, hit the “**Launch the Map**” link.
5. Your first task is to use the *Interactive Map* to find a correlation between a *measure of pollution/pollutant effects* and a *measure of the built environment*. Here are some tips for completing this task:
 - a. Because the “layering” features of the *Interactive Map* are pretty difficult to use, it is probably better to use the ability to toggle datasets “on” and “off” to search for correlations.
 - b. There are a lot of *measures of pollution/pollutant effects* in the various datasets, most of which can be found in the “National” dataset; there are several categories in this dataset that explicitly relate to pollution.

Group Activity: How biodiversity impacts ecosystem services

WETLANDS / WATER QUALITY

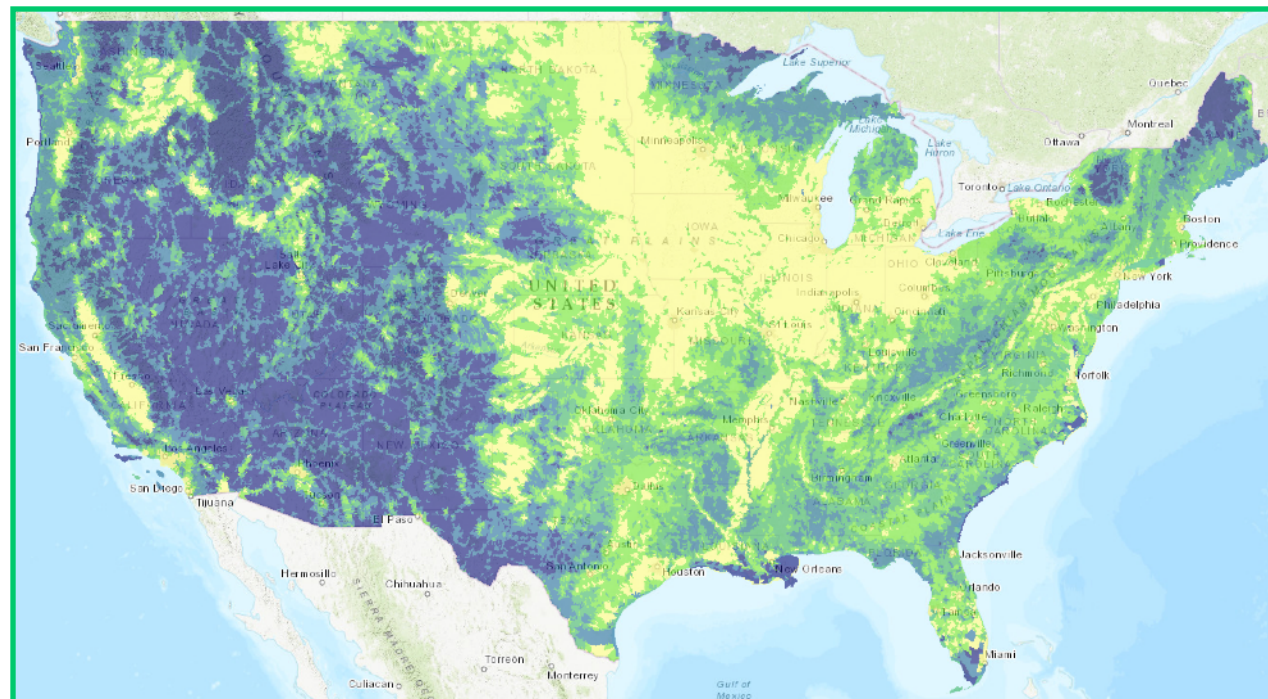
Wetlands are often thought of as sinks that collect and remove contaminants (Vellidis et al., 2003). Studies show that wetlands can remove up to 99% of nutrients (Xiong et al., 2011), 89% of metals (Khan et al., 2009) and 100% of pesticides (Budd et al., 2009). Water-quality discriminant analysis indicated that a reclaimed-water

Students make ecosystem service connections based on scientific studies



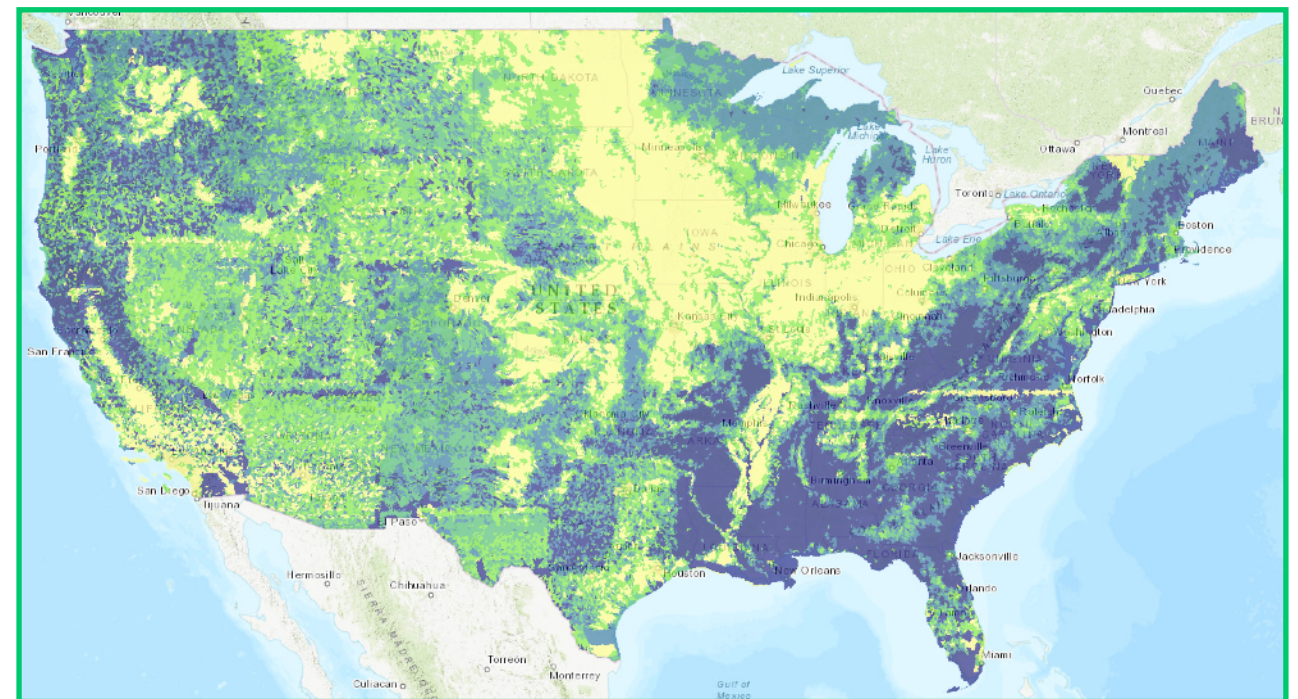
Group Activity: How biodiversity impacts ecosystem services

measure of biodiversity:



Percent Natural Land Cover

measure of ecosystem service provision:



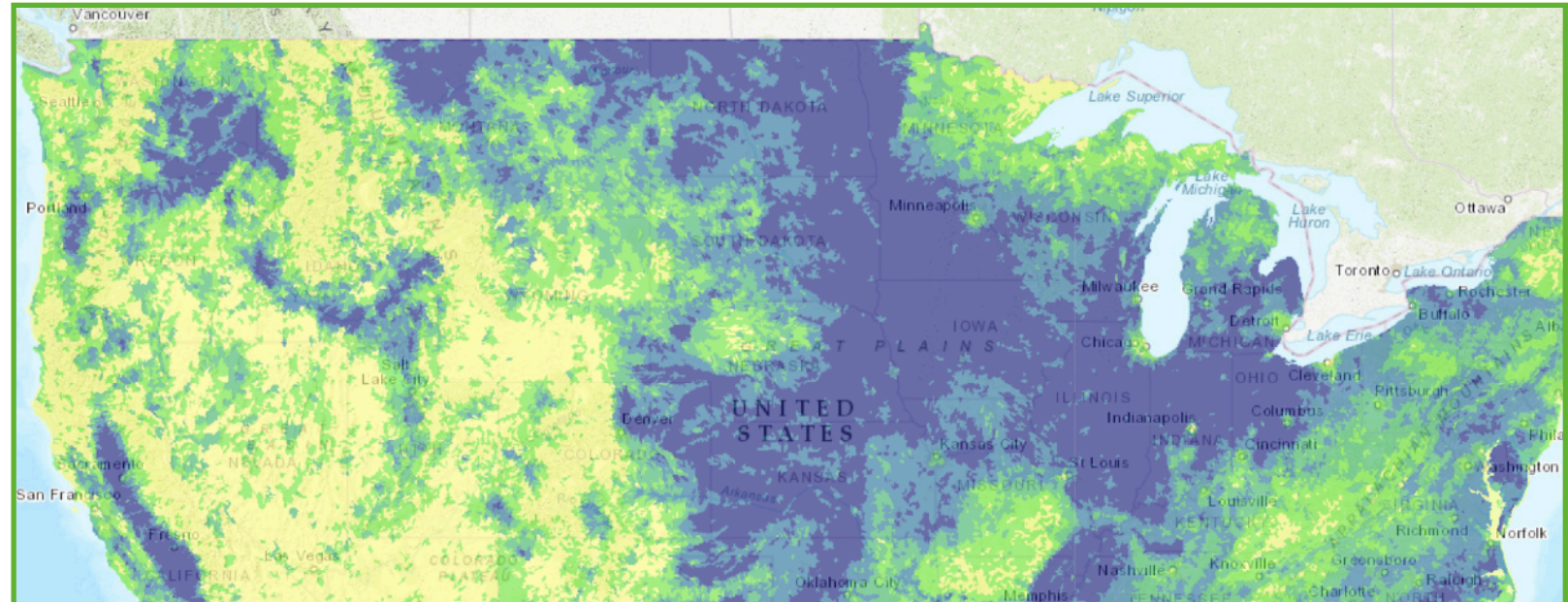
Natural Biological Nitrogen Fixation

Students search for correlations between measures of biodiversity and measures of ecosystem services

Group Activity: Pollution and the built environment

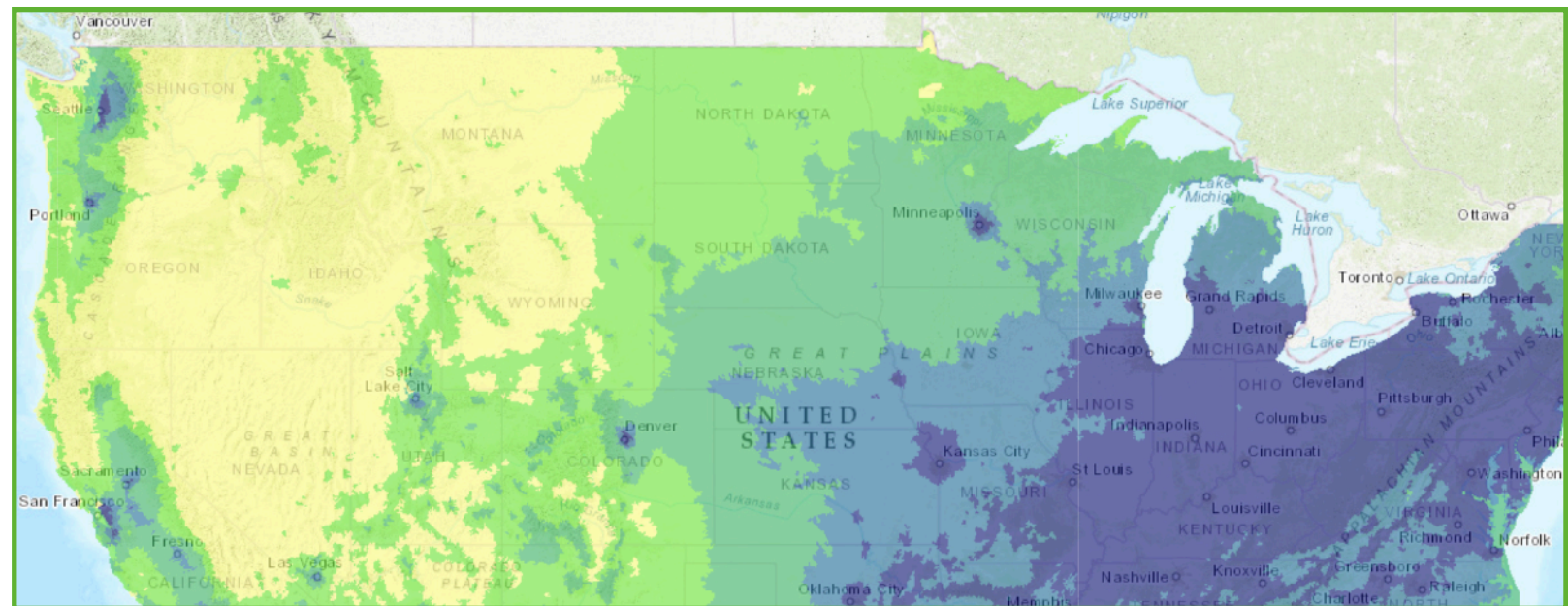
measure of the built environment:

Percent Cropland



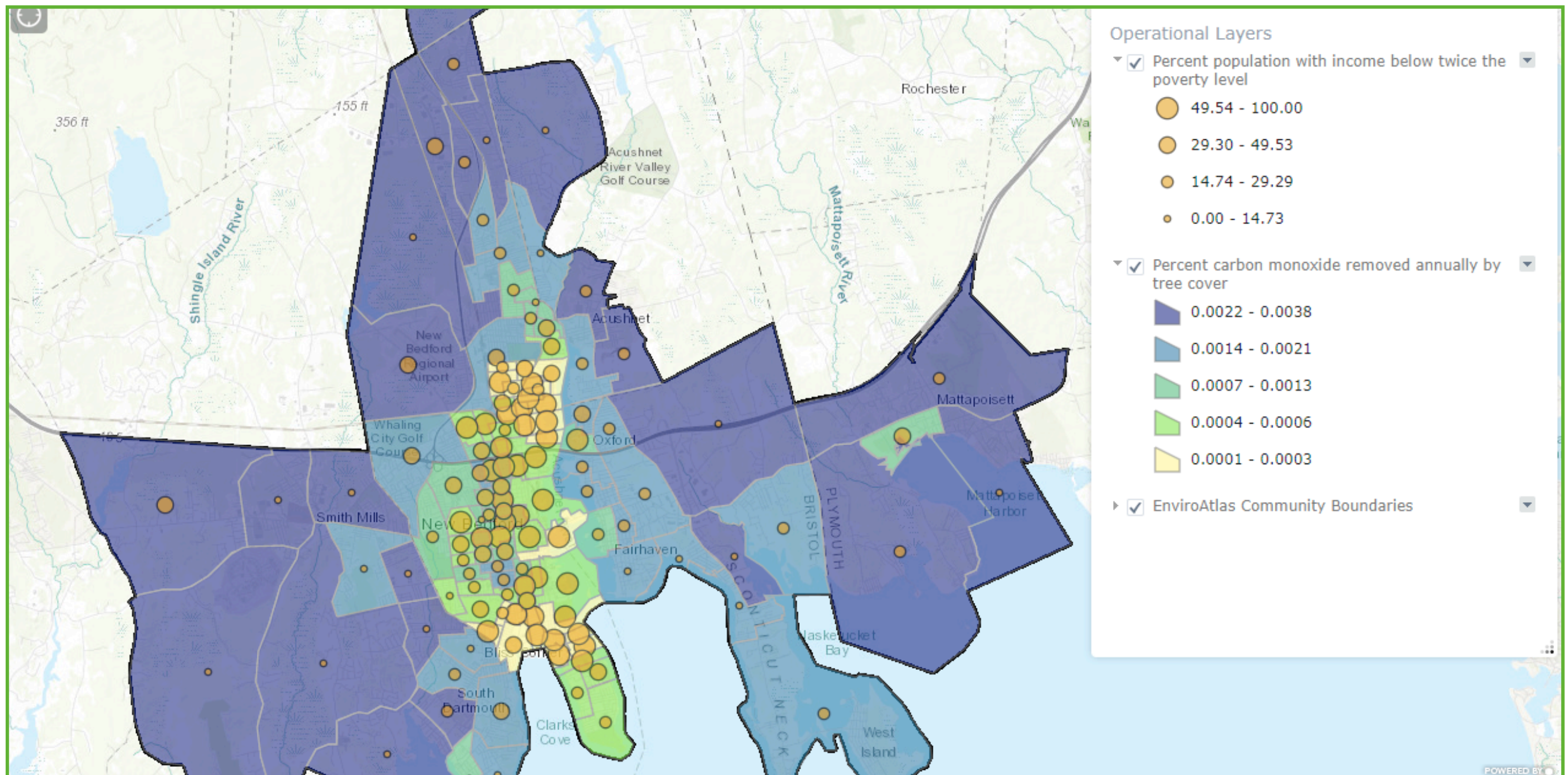
measure of pollution:

*Total Annual
Oxidized Nitrogen
Deposition*



Students search for correlations between measures of the built environment and measures of pollution

Group Activity: Pollution and the built environment



People with low income tend to live in places where there are fewer trees to remove carbon monoxide pollution

Students search for evidence of environmental injustice

Features of *EnviroAtlas* that empower students

- ★ Accessible on any computer with a web browser
- ★ Not complicated to use
- ★ Allows for user-driven exploration
- ★ Connects to a powerful and meaningful database

EnviroAtlas as a gateway to more rigorous GIS work

SAVI Pratt

ABOUT SAVI TECHNICAL ASSISTANCE AND RESEARCH GIS AND DESIGN CERTIFICATE PROGRAM SAVI FOR PRATT

Data Driven GIS Education

Interdisciplinary education, consulting, and research hub

The Spatial Analysis and Visualization Initiative at Pratt Institute is a geographic information systems-centered research and service center that uses mapping, data and design to understand urban communities.

Technical Assistance and Research

GIS and Design Certificate Program

SAVI Resources for Pratt Institute

Poll Anywhere Question:

- 2a. How useful are readily-available maps of biodiversity, ecosystem services, and human infrastructure to further your sustainability efforts?**
- 2b. Give an example of how your organization could use maps of biodiversity, ecosystem services, and human infrastructure to further your sustainability efforts.**