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INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

URBAN ATLAS WILL HELP FOSTER COMMUNITY SUSTAINABILITY

Issue

Towns and cities rely on clean air, water and other natural resources for economic sustainability and quality of life. Yet, these natural resources and their benefits are not always fully understood or considered in local decisions.

EPA researchers are producing the Urban Atlas, a web-based, easy-to-use mapping tool that citizens and planners can use to assess the status of local natural resources and their benefits. A component of the National Atlas for Sustainability, the Urban Atlas will provide data and allow planning at a more detailed scale.

Users can also evaluate the different impacts on natural resources under future conditions like population growth and climate change.

Researchers are working to develop the Urban Atlas initially for 50 cities and towns of varying size, location, demographic makeup, and environmental and health risks. Specifically, the Urban Atlas will map the following benefits of nature (known as ecosystem services) in selected populated areas:

- Temperature regulation (cooling)
- Filtering of pollutants from the air, both overall and near roads

Aerial photography of downtown Portland, ME, classified into open space (greens), impervious surfaces (pink), and water (blue)

- Filtering of water
- Protections of quality and supply of drinking water
- Access to nature and open space
- Potential for food production

Factors affecting human health and well-being will be included to assess risks from:

- Heat waves
- Air pollution from traffic
- Flooding
- Algal blooms (which can be toxic)
- Contamination of drinking and recreational waters
- Lack of opportunity for physical exercise, outdoor experience and play.

Benefits of the Urban Atlas

The Urban Atlas will include elements of the i-Tree toolkit developed by the USDA Forest Service, which calculates multiple benefits of urban forest cover on a tree-by-tree basis. The use of this tool will help identify the extent to which trees and other natural infrastructure meet community needs and where the number of trees fall short. It will also help decision-makers understand the additive benefits of natural resources, and how their loss or degradation may be contributing to cumulative burdens on community health and well-being.

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Ecosystem Services: Street Trees

Street trees can create shade, filter air pollutants, store rainwater, and beautify an area. The Urban Atlas will map the extent of street trees at the neighborhood scale and provide fact sheets explaining their multiple benefits. It will include data on the residential population and sub-populations who receive these benefits locally.

In addition, where possible, the Urban Atlas will use these population counts to estimate reduced illness and health-care and other savings from street trees. These numeric estimates use data from household budgets and scientific research on the influence of street trees on selected health issues such as respiratory illness. In this way, the urban atlas can assess the full worth of street trees in comparison with costs.

Users will be able to contrast the levels of ecosystem services available across different neighborhoods, socioeconomic groups, and populations with specific health vulnerabilities.

Tackling Environmental Justice

Another useful application of the Urban Atlas is in evaluating and promoting environmental justice. Environmental justice encompasses the fair treatment and distribution of ecosystem threats and services within a community, regardless of race, religion, national origin or income. Users may address disparities between communities by comparing estimates of ecosystem services in socially vulnerable neighborhoods to estimates in other parts of town.

An example is proximity to parklands, which can be assessed from neighborhood to neighborhood to evaluate equity in opportunities for exercise, play, and social interaction.

Using this information, the Urban Atlas can reveal where environmental equity can be enhanced through investments such as parkland and community gardens. The payoff to cities can then be assessed in terms of expected health improvements and cost savings, in addition to co-benefits such as more vibrant communities and increased property values.

Relationships between ecosystem services and human health continue to emerge through scientific research. With the Urban Atlas, these new links can be explored in various locations more broadly, resulting in potentially significant contributions to the science. The Urban Atlas will highlight current knowledge gaps for further investigation.

EPA is conducting this project in collaboration with several federal agencies, including the U.S. Department of Agriculture's Forest Service, the U.S. Geological Survey, and the Centers for Disease Control and Prevention, as well as other academic and educational organizations.

The first version of the Urban Atlas will be released in 2013, with subsequent releases following as more data become available. In future years, an additional 100 to 200 cities will be included, dependent upon available funding and program success.

REFERENCES:

Millennium Ecosystem Assessment (MEA). 2005. Ecosystems and Human Well-Being: Health Synthesis. Washington, DC: Island Press. http://www.maweb.org/-documents/document.357.aspx.pdf

The President of the U.S. Executive Order 12898 of February 11, 1994. Federal Register Vol. 59, No. 32 Wednesday, February 16, 1994. "Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations" http://www.archives-.gov/federal-register/executive-orders/pdf/12898.pdf

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