EnviroAtlas

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Integrating Ecosystem Services into Health Impact Assessment

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Abstract

Tools and methods for quantitatively and qualitatively evaluating associations between the environment and health are necessary for understanding the potential impact of decisions and plans on health. A guide for using EnviroAtlas to integrate ecosystem services into Health Impact Assessment (HIA) was developed to highlight EnviroAtlas as a resource that can be used by planners, researchers, public health professionals and engaged citizens to gain a greater understanding of linkages between ecosystems, ecosystem services, and health. The guide is being created through an iterative process of literature and HIA report review, conversations with practitioners, and field and retroactive testing. The guide aims to close data gaps, increase the utilization of available tools, and address improvements that were identified in a 2013 EPA review of best practices in HIA. The guide will aid HIA practitioners in identifying regions of disparate burden and possible points of intervention and health promotion by linking ecosystems, ecosystem services and human health.

Next steps include identifying test communities for integrating ecosystem services into HIA processes and bundling the guide into training tools available through EnviroAtlas. Resources like EnviroAtlas can help facilitate the inclusion of environmental health considerations into decision making and aid in understanding the pathways through which health outcomes occur.

Background

What is HIA?

Health Impact Assessment (HIA) provides a methodology for incorporating considerations of human health into planning and decision-making processes. HIA promotes interdisciplinary action, stakeholder participation, and timeliness, and takes into account equity, sustainability, and best available evidence.

What is EnviroAtlas?

EnviroAtlas is a suite of tools and resources that includes an ecosystem services mapping application and an Eco-Health Relationship Browser. Hundreds of data layers for the conterminous US and select communities can be viewed in an interactive mapping application or downloaded for further analysis. Data for natural resources, potential stressors, and demographics are available, lending support to a systems approach to considering health in decision-making. Additionally, the Eco-Health Relationship Browser provides an up-to-date review of the current state of eco-health science, focusing on the hazard buffering and health promotional benefits of green infrastructure.

HIA and Ecosystem Services

Many of the decisions that we make, from how we develop the infrastructure in our communities, to the ways that we manage surrounding land and resources, affect public health through their impacts on the provision of ecosystem services (Figure 1).

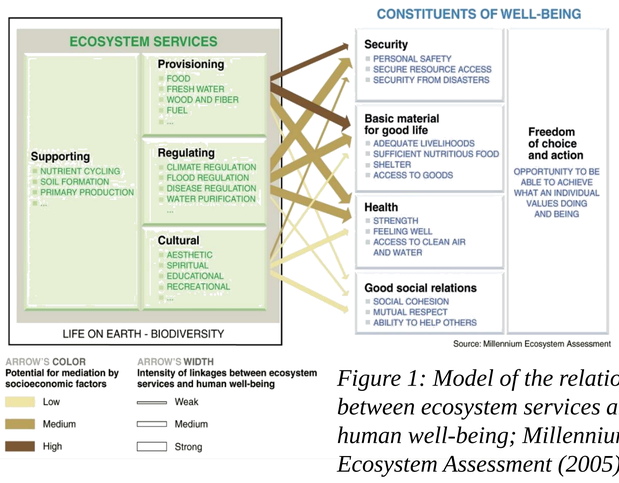

Figure 1: Model of the relationship between ecosystem services and human well-being; Millennium Ecosystem Assessment (2005).

Eco-Health Relationship Browser

The Browser is a tool that visually illustrates linkages between key ecosystems, ecosystem services, and human health concerns.

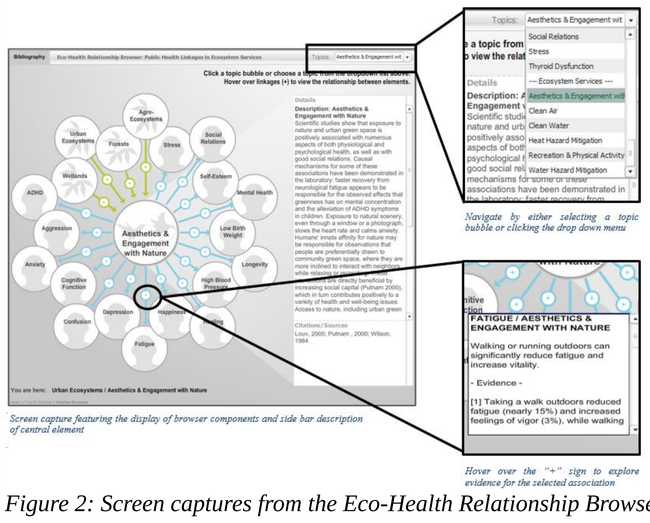

Figure 2: Screen captures from the Eco-Health Relationship Browser

The Eco-Health Browser may aid in HIA by:

- Identifying issues of concern for assessment
- Illustrating the evidence-based connections between health and ecosystem services
- Highlighting the potential outcomes of different decision alternatives
- Providing examples of how relationships between ecosystems, ecosystem services, and health have been previously assessed

While developed from a broad selection of recent, peer reviewed evidence, the Browser is not exhaustive. Most of the studies included highlight statistically significant, plausible associations rather than cause-effect relationships.

Recommended EnviroAtlas Resources for Each Step of the HIA Process

SCREENING

Determine the need and value of an HIA

- **Eco-Health Relationship Browser** — Documents potential health impacts related to natural resources
- **Interactive Map** — Helps to identify environmental stressors and disparities
- **Case Studies & Use Cases** — Provide examples of EnviroAtlas applications (under development)
- **Fact Sheets** — Contain information on relevance of each EnviroAtlas map to public health and well-being

SCOPING

Determine who will be involved, what will be evaluated, analysis methods, and a plan and timeline

- **Eco-Health Relationship Browser** — Can guide selection of potential HIA focus areas
- **Fact Sheets** — Highlight the environmental, social, and economic importance of ecosystem services

ASSESSMENT

Profile existing health conditions; Evaluation of impacts and consideration of sub-populations

- **Interactive Map** — Ecosystem services layers can be overlaid with demographics
- **Mapping & Analysis Tools** — Overlay local data onto the online tool or use drawing/analysis tools
- **GIS Tools** — Download GIS tools to further assess existing conditions
- **Metadata** — Support detailed understanding or additional analysis of EnviroAtlas metrics/data

RECOMMENDATIONS

Strategies to address selected health impacts

- **Eco-Health Relationship Browser** — Highlights the potential outcomes of different decision alternatives
- **Fact Sheets** — Contain suggestions on the application of each EnviroAtlas map to public health and well-being
- **Case Studies & Use Cases** — Can provide examples of applications to health (under development)

REPORTING

Develop final report; Communicate findings

- **Mapping & Analysis Tools** — Maps can be created and printed directly from EnviroAtlas

MONITOR/ EVALUATE

Track impact of HIA (process, decisions & health outcomes)

Figure 3: Where EnviroAtlas resources can be used at each step of the HIA process

Figure 4: Fact sheet for the community map Percent Tree Cover

Interactive Map

The interactive map is a primary component of EnviroAtlas. EPA researchers and partners are developing and incorporating the best available science to map and analyze indicators of ecosystem services, societal demands for them, and their stressors. Data are developed at two scales: 12 digit hydrologic watershed basins (12-digit HUCs) for the contiguous United States and U.S. Census block groups for selected communities.

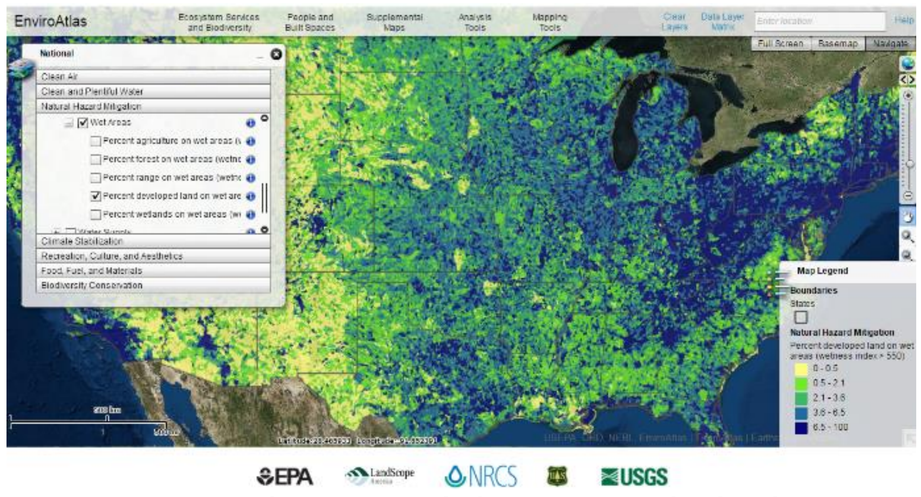

Figure 5: Screen capture of Interactive Map displaying Percent Developed Land on Wet Areas for the Nation

Ecosystem Services and Biodiversity data are organized into seven benefit categories:

- Clean air
- Clean and plentiful water
- Natural hazard mitigation
- Climate stabilization
- Recreation, culture, and aesthetics
- Food, fuel, and materials
- Biodiversity conservation

The community component includes high-resolution social and economic benefits estimation, and information on health issues associated with each benefit category.

A few examples of the topics included in the community component are:

- Residential proximity to green space and walking distances to parks
- Potential of near-road tree cover to buffer air pollution from traffic
- Capacity of natural vegetation to protect water quality and reduce urban heat-island effect
- Adverse health events avoided and dollars saved due to air pollutant removal by trees

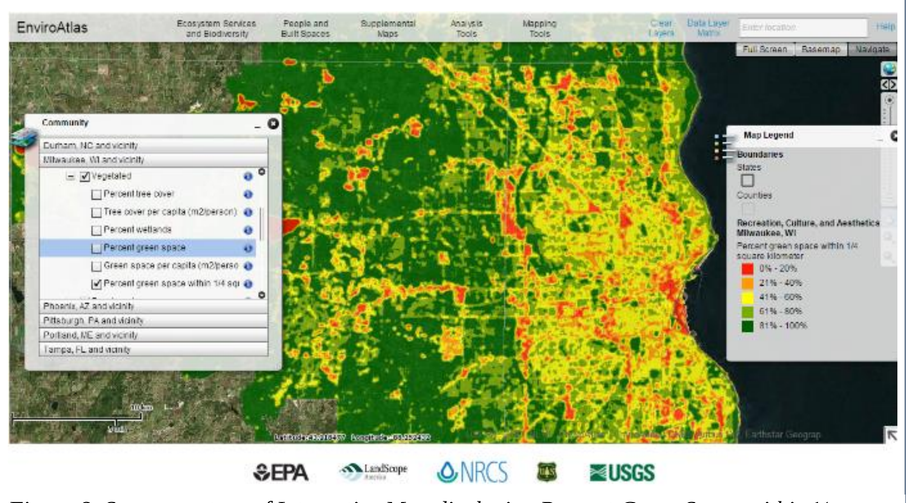

Figure 6: Screen capture of Interactive Map displaying Percent Green Space within ¼ square kilometer in Milwaukee, WI

EnviroAtlas Case Studies and Use Cases

Tree Planting: As a part of the project *Trees Across Durham*, EnviroAtlas community data for Durham, NC, were used to aid in prioritizing planting locations that maximize the environmental, social, and economic benefits for the public.

Conservation of Natural Lands: The *Southeast Atlantic Landscape Conservation Cooperative* has used EnviroAtlas data layers to help them develop a stakeholder-driven conservation blueprint for the region.

Community Education: EnviroAtlas community 1 meter land cover maps are utilized as a part of the *Durham Neighborhood Compass*. The compass was developed to aid community members in identifying where their public service efforts may have the greatest impact.

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