



## Eco-Health Relationship Browser

A growing body of evidence demonstrates that [ecosystems](#) can provide protection from natural and man-made hazards, and promote healthful behaviors. This EnviroAtlas tool demonstrates the scientific evidence for linkages between human health and the benefits provided by Nature, or [ecosystem services](#). While not exhaustive, the information illustrated in this Browser is based on an extensive literature review and highlights statistically significant, plausible associations. The tool is interactive and designed to invite exploration of the services that ecosystems provide and how those services affect human health and well-being.



Photo: Steve Hillebrand, USFWS

COMPONENTS	FEATURES
Ecosystems	Forests Wetlands Drylands Agro-Ecosystems Urban Ecosystems
Ecosystem Services	Air Quality Water Quality Heat Hazard Mitigation Water Hazard Mitigation Recreation & Physical Activity Aesthetics & Engagement with Nature
Health Outcomes	ADHD, Aggression, Anxiety, Arthritis, Asthma, Birth Outcomes, Bronchitis, Cancer, Cardiovascular Diseases, Cognitive Function, Confusion, COPD, Depression, Diabetes, Fatigue, Gastrointestinal Illness, Happiness, Healing, Heat Stroke, High Blood Pressure, Hospital Admissions, Inflammation, Kidney Malfunction, Longevity, Low Birth Weight, Mental Health, Migraine, Miscarriage, Mortality, Obesity, Pre-Term Birth, PTSD, Respiratory Symptoms, Self Esteem, Social and Community Ties, Stress, Thyroid Dysfunction, Vulnerable Populations

*Eco-Health Relationship Browser components and features (as of 9/19)*

### How can I use this information?

The [Eco-Health Relationship Browser](#) can be used as a reference to inform decisions on issues such as climate adaptation and [environmental justice](#). It can facilitate planning and implementation of [public health](#) interventions, and indicate where there may be additive societal benefits to an investment in green infrastructure. The Eco-Health Relationship Browser adds interpretative information when used in conjunction with the EnviroAtlas interactive map. It can also serve as a teaching tool (for example, <https://www.epa.gov/enviroatlas/connecting-ecosystems-and-human-health>), and as a resource for environmental health research.

### How does this Browser function?

Designed to encourage exploration, this Browser interactively displays the linkages between selected ecosystems, ecosystem services, and health outcomes. The user can click on topic “bubbles” on the default display, or select topics using the drop-down menu, and navigate through the relational links that appear. A description of the selected topic is detailed in the right sidebar, with references.

When the user clicks the “i” linkage between two topics, a pop-up box appears with a summary of the published evidence; this includes specific studies that investigated the

selected association. An [online bibliography](#) contains citations for all references, with abstracts and web links if publicly available.

## Browser development and limitations

The information in this Browser is based on a systematic literature review of peer-reviewed journal articles published through 2015 (periodic updates are performed). Most research to date linking human health to health-promotional ecosystem services (as opposed to protective or buffering ecosystem services) is associative rather than causal. Articles focusing on linkages between human health and the built environment (e.g., neighborhood connectivity, land use mix) are not included as they fall outside of the project parameters.

## Publication

Jackson, L. E., Daniel, J., McCorkle, B., Sears, A., & Bush, K. F. 2013. Linking ecosystem services and human health: the Eco-Health Relationship Browser. *International Journal of Public Health*, 58(5), 747-755. doi: 10.1007/s00038-013-0482-1. Epub 2013 Jul 23.

The Eco-Health Relationship Browser can be accessed through the [EnviroAtlas website](#); the content may also be saved in plain text format. For specific questions about this tool, please contact the [EnviroAtlas Team](#).

## Acknowledgements

EnviroAtlas is a collaborative effort led by EPA. The Eco-Health Relationship Browser was designed using Moritz Stefaner's open-source software. It was developed by Laura Jackson, EPA and Jessica Daniel and Betsy McCorkle, independent contractors to the EPA. This fact sheet was written by Pamela Barclay, EPA ORISE Fellow.

Screen capture showing the Browser components and sidebar description

**Bibliography** Eco-Health Relationship Browser: Public Health Linkages to Ecosystem Services

**Aesthetics & Engagement With Nature**

These interactions are directly beneficial by increasing social capital (Putnam 2000), which in turn contributes positively to a variety of health and well-being issues. Access to nature, including urban green space, allows for engagement with the natural world and seems to have health benefits that extend beyond those derived from outdoor exercise. Gardens have long been components of hospital grounds and urban settings for their perceived benefits to well-being. Engagement with less cultivated outdoor environments is believed to facilitate exploration, creativity, and self-esteem in children (Louv 2005). The notion that humans, as natural creatures that evolved within ecological settings, have an innate affinity for nature has been dubbed biophilia (Wilson 1984). This concept is one explanation for observed improvements in many aspects of human health with increased exposure to features, even representations, of the natural world.

**Citations**  
Louv, 2005; Putnam, 2000; Wilson, 1984

**Ecosystem**  
Agro-Ecosystems  
Drylands  
Forests  
Urban Ecosystems  
Wetlands

**Ecosystem Services**  
Aesthetics & Engagement With Nature  
Air Quality  
Heat Hazard Mitigation  
Recreation & Physical Activity  
Water Hazard Mitigation  
Water Quality

**Health Outcomes**  
ADHD  
Aggression  
Anxiety  
Arthritis  
Asthma  
Birth Outcomes  
Bronchitis  
Cancer  
Cardiovascular Diseases  
Cognitive Function  
Confusion  
COPD  
Depression  
Diabetes  
Fatigue  
Gastrointestinal Illness

**Linkages**

**Aesthetics & Engagement With Nature | Mental Health**

Those who live near green spaces and/or engage with green environments report positive mental health benefits such as mental restoration and better mental health overall.

**Green space in urban environments**

[1] Those who reported the highest degree of neighborhood greenness had almost twice the odds of being in the better mental health category, compared with those who perceived little greenness in their neighborhood (OR=1.60). Recreational walking, as evidenced when added to the model, may be the mediator for this relationship (Sugiyama et al., 2008; n=1,845, Australia).

*Navigate by either selecting a topic bubble or clicking the dropdown menu*

*Click the "i" to explore evidence for the selected association*