

# Equity in urban watersheds

## A WATERSHED LEARNING NETWORK MODULE

*This material was generated as part of a collaboration between members of the Atlanta Watershed Learning Network and students and faculty of a service learning course in urban ecology. The views and opinions expressed in these materials are those of the authors and do not necessarily reflect the official policy or position of the University of Georgia.*



In this module, you will learn about equity and environmental justice. We will focus on issues of equity and environmental justice in urban watersheds.

This material was based on a curriculum developed by members of the Atlanta Watershed Learning Network, led by Dr. Yomi Noibi of Eco-Action.

Unless otherwise noted, all of the diagrams and models used in the modules were created by Diane Kelment, the video material was captured and edited in large part by Allison Krausman, and the images used in the modules were taken by the students or instructor of the urban ecology course at UGA in 2018 or the West Atlanta Watershed Alliance.

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2

## Norwood acts to 'fix sewage-filled' discharges into streams, neighborhoods

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Development in urban watersheds interacts with water infrastructure to influence communities differently via flooding and exposure to contaminants.

## Definition of EQUITY

There are several definitions of equity, but the definition we will be discussing is: justice according to natural law or right; specifically freedom from bias or favoritism--something that is equitable



According to Merriam Webster one of the definitions of equity is justice according to natural law or right; specifically freedom from bias or favoritism--something that is equitable. In the case of equity related to the environment, it may be helpful to think about the equitable distribution of perceived ecosystem services and ecosystem disservices that an individual receives from the environment. You can learn more about ecosystem services another WLN module.

Source: <https://www.merriam-webster.com/dictionary/equity>

## Definition of ECOSYSTEM SERVICES

the benefits people derive from ecosystems

But they can be described as “the benefits people derive from ecosystems”. Watersheds can provide important ecosystem services, including water purification, flood control, fisheries, recreational opportunities, etc. However, they can also produce ecosystem disservices for humans living within and outside of their boundaries.

Sources:

<https://www.iucn.org/commissions/commission-ecosystem-management/our-work/cems-thematic-groups/ecosystem-services>

## Definition of ECOSYSTEM SERVICES

the benefits people derive from ecosystems

## Definition of ECOSYSTEM DISSERVICES

outcomes of ecosystem functions that negatively affect human communities

Saunders and Luck 2017; Millennium Ecosystem Assessment 2005 

Saunders and Luck (2017) define ecosystem disservices as outcomes of ecosystem functions that negatively affect human communities. Urban communities may be subject to ecosystem disservices associated with water, including but not limited to flooding associated with storm events and sea-level rise and exposure to contaminants and vectors of disease, such as mosquitoes.

Sources:

<https://onlinelibrary.wiley.com/doi/full/10.1111/cobi.12740>

### **Limitations of the ecosystem services versus disservices dichotomy**

[Manu E. Saunders](#)

[Gary W. Luck](#)

First published: 24 April 2016

<https://doi.org/10.1111/cobi.12740>

Sources:

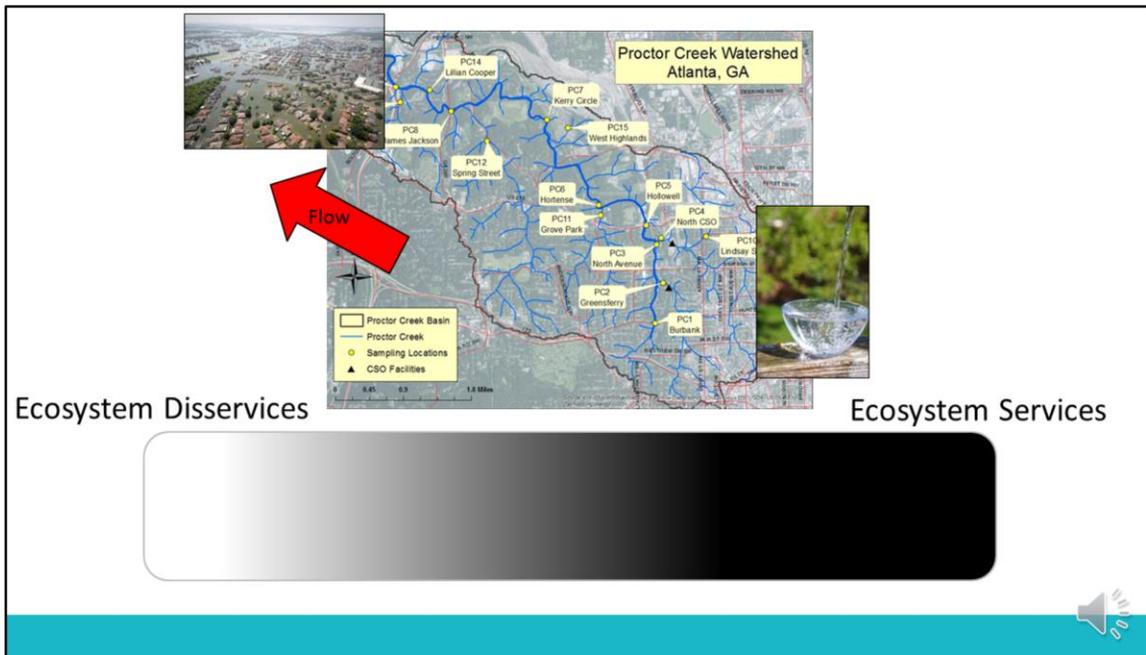
<https://www.iucn.org/commissions/commission-ecosystem-management/our-work/cems-thematic-groups/ecosystem-services>

Ecosystem Disservices

Ecosystem Services



It is also important to understand that the same environmental condition, may simultaneously provide an ecosystem service and a disservice. For example, a rain storm, may provide an important ecosystem service by re-charging drinking water supplies, but may also lead to extreme flooding in certain areas.



Notably, the same event may produce services for one community while subjecting other groups to negative situations. For instance, the rainstorm mentioned above may just provide services for communities living in higher parts of the watershed, and may provide both services and disservices for people living downstream, as is the case in Atlanta’s Proctor Creek.

[EPA](#) On this page: This map outlines the watershed and identifies the sampling locations, CSO facilities and the proctor

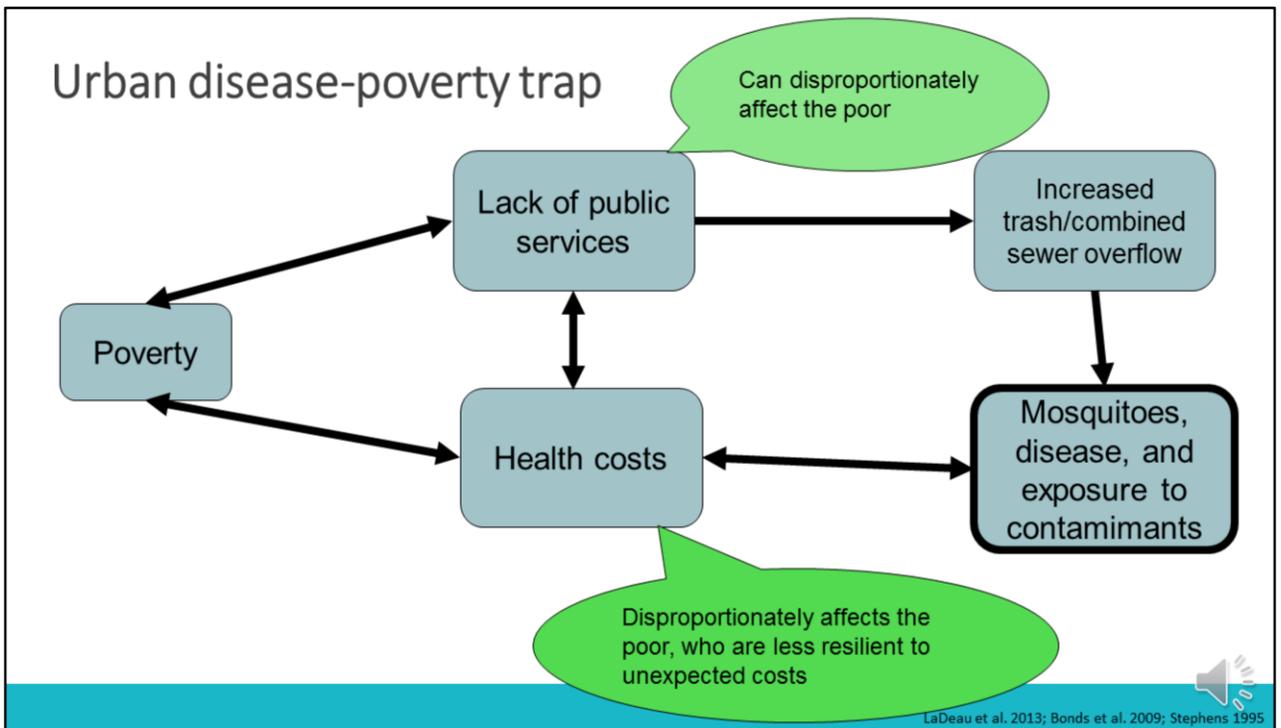
## **Definition of ENVIRONMENTAL JUSTICE**

The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies



Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies. Integrating ideas of environmental justices into discussions of equity and the balance of ecosystem services and disservices can be an effective way to examine issues associated with urban watershed management.

Source: <https://www.epa.gov/environmentaljustice/learn-about-environmental-justice>



For example, when thinking, poverty can strongly impact exposure to disease and contaminants in urban watersheds. Interactions between poverty, public services, and health care costs can interact with negative environmental conditions in urban watersheds, including flooding of contaminated water and increased amounts of standing water, and increase the exposure of communities to pathogens and chemicals.

#### **Poverty trap formed by the ecology of infectious diseases**

Matthew H. Bonds, Donald C. Keenan, Pejman Rohani, Jeffrey D. Sachs  
Published 9 December 2009. DOI: 10.1098/rspb.2009.1778

#### **The urban environment, poverty and health in developing countries**

CAROLYN STEPHENS

*Health Policy and Planning*, Volume 10, Issue 2, 1 June 1995, Pages 109–121, <https://doi.org/10.1093/heapol/10.2.109>

**Published:**

01 June 1995

[Int J Environ Res Public Health](#). 2013 Apr; 10(4): 1505–1526.

Published online 2013 Apr 12. doi: [10.3390/ijerph10041505](https://doi.org/10.3390/ijerph10041505)

PMCID: PMC3709331

PMID: [23583963](https://pubmed.ncbi.nlm.nih.gov/23583963/)

Higher Mosquito Production in Low-Income Neighborhoods of Baltimore and Washington, DC: Understanding Ecological Drivers and Mosquito-Borne Disease Risk in Temperate Cities

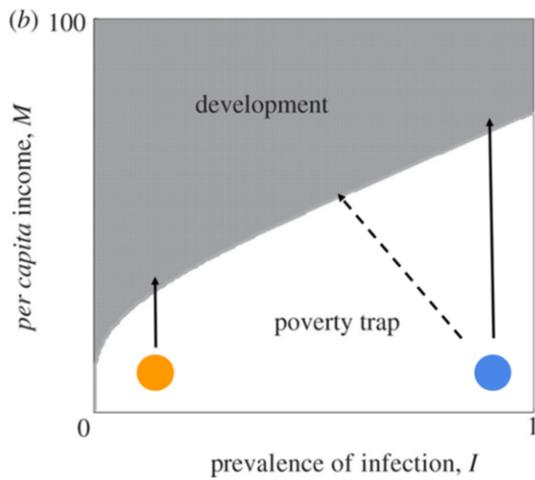
[Shannon L. LaDeau](#),<sup>1,\*</sup> [Paul T. Leisnham](#),<sup>2,†</sup> [Dawn Biehler](#),<sup>3</sup> and [Danielle Bodner](#)<sup>2</sup>

# Examples from Atlanta



Using Atlanta as an example, poorer communities are often affected by combined sewers and influenced by flooding. Therefore, people living in affected neighborhoods are exposed to raw sewage and contaminants in flooding streams. Oftentimes, neighborhoods subject to flooding are characterized by higher densities of abandoned homes.

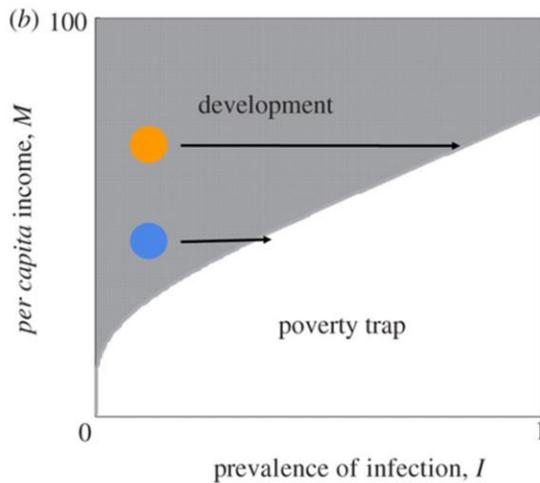
## Disease can make escaping poverty more difficult...



Higher infection means the blue circle must have a larger increase in income to move out of poverty

Exposure to pathogens can make it more difficult for people to escape poverty. Sicker people have to have a much greater income to escape poverty.

## And easier to fall into poverty



- Ability to cope with illness is also dependent on income
- The orange circle is more resilient to disease because it takes more disease to push it into poverty

Increasing poverty also influences the ability of a person to cope with illness. Poorer people can fall into poverty much more rapidly when exposed to the same levels of infection.

## Distributive justice



**Who gets what?**



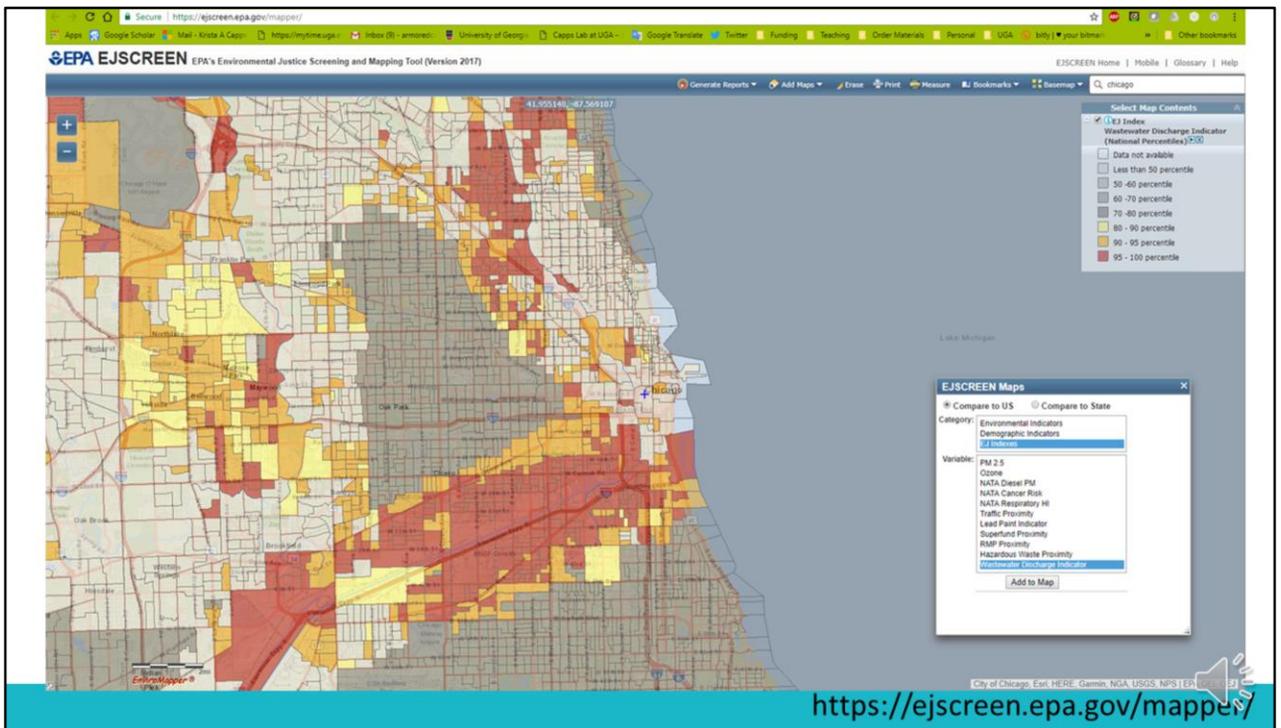
Discussions about environmental justice and equity are often discussions about ethics. As the name “distributive justice” suggests, theories of distributive justice attempt to explain the most ethical way that goods, services and opportunities should be distributed within a society. For example, one simple distribution might be: everyone should be given the exactly the same amount of good, services, and opportunities. On the one hand, this may seem the fairest scheme because everyone is treated completely equally.



But “what” is being distributed is not always wealth or income. “What” can be negative. This is especially true when we think about environmental issues.



The water crisis in Flint, Michigan is a great example of a recent environmental justice challenge faced by communities in urbanizing watersheds.



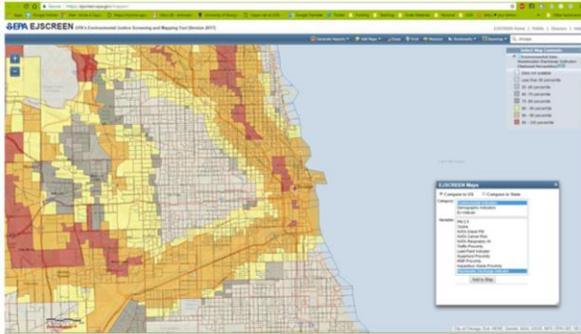
A great tool to examine potential environmental justice issues in your watershed is the EJScreen by the USEPA. The agency has generated an Environmental Justice Index, which they define as, “The EJ index is a number that combines environmental and demographic information for a place. There is an EJ Index for each environmental indicator. The EJ Index highlights which block groups contribute the most toward low-income/ minority residents nationwide having a higher environmental indicator score on average than the rest of the US population. To calculate a single EJ Index for one block group, EJSCREEN multiplies the environmental indicator by demographic information. This demographic information includes percent low-income and percent minority (as the Demographic Index), and total population of the block group. This is the formula for the index:

$$\text{EJ Index} = (\text{Environmental Indicator}) \times (\text{Demographic Index for Block Group} - \text{Demographic Index for US}) \times (\text{Population Count for Block Group})$$

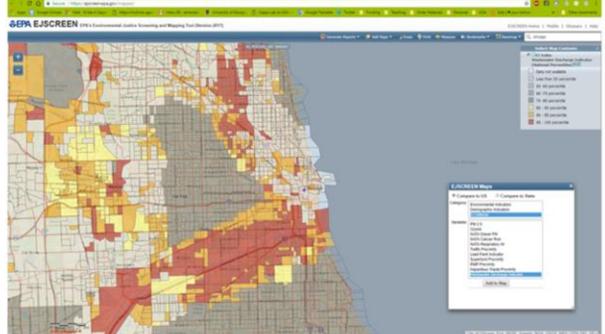
- For example, in this image, we have gone back to the map of wastewater discharge indicators around Chicago, but we have used the “EJ Index” instead of the “Environmental Indicator” mapping tool

<https://www.epa.gov/ejscreen/glossary-ejscreen-terms#category-enviro>

## Environmental Indicator



## EJ Index



<https://ejscreen.epa.gov/mappe/>

- You can see differences between the two maps. The map on the right highlights which block groups contribute the most toward low-income/minority residents nationwide having a higher environmental indicator score, in this case, potential exposure to toxins from wastewater discharge, on average than the rest of the US population.
- If you would like to explore potential environmental justice issues in your watershed, visit the EJScreen website and map your city.

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