

# GREEN ROOFS

## Summary:

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Grey areas such as asphalt and concrete roof tops, roads, parking lots, and sidewalks cover as much as 70% of our most dense and sprawling cities adding to the urban heat island affect, increasing smog and dust, water runoff, and leaving little room for natural habitat. The incorporation of green spaces, areas with soil and growing vegetation such as green roofs, can decrease these issues through temperature mediation, storm water absorption, slowing runoff, supporting biodiversity, and encouraging human health and activity.

Urban heat islands can cause serious harm to the environment and human health by drastically increasing summer temperatures. Heat illnesses often cause death for lower income, inner city residents, the elderly, and children. The 1995 heat wave in Chicago caused the death of 739 people in five days.<sup>1</sup> Higher temperatures also increase the demand for electricity. This causes a decrease in air quality as power plants dump more pollutants into the air to keep up with the demand for cooling. Pollutants also form more readily at higher temperatures increasing smog.

Green roofs can mitigate urban heat island by increasing vegetation and surface reflectivity. An asphalt roof can reach temperatures of 160 degrees F on a hot summer day were as green roofs rarely exceed 80 degrees.<sup>2</sup>

Water runoff occurs because precipitation cannot infiltrate into asphalt and concrete. Rather it runs across the surface and collects in sewage systems. Large rainstorms can potentially overwhelm sewage systems and water treatment plants causing flooding and untreated water to overflow into waterways. In New York City, 40 billion gallons of untreated wastewater, of which 20 percent is raw sewage, flows into waterways each year.<sup>3</sup>

Green roofs retain storm water, slowing the rate at which water enters the sewage system while filtering out contaminants.

Green roofs can also aid in reintroducing wild life and plant species into the metropolis by providing habitat for birds and small animals and growing media for native grasses and even small trees.

Human health and overall well being are equally affected by our environment. Introducing green spaces to our cities provides places for relaxation, gathering, socializing, and outdoor activity.

Other benefits of green roof systems are increased roof life spans, lower energy bills because of a green roof's insulative qualities, and increased overall building value.

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1           Katrin Scholz-Barth, "From Grey to Green: Environmental Benefits of Green Roofs" in Green Roofs: Ecological Design and Construction, ed. Siena Chrisman (Atglen, PA: Schiffer Publishing Ltd., 2005), 17.

2           Ibid.

3           Scholz-Barth, 18.

## Resources:

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### **Books:**

#### **Green Roof Plants: A Resource and Planting Guide**

by Edmund C. Snodgrass and Lucie L. Snodgrass

[http://www.amazon.com/Green-Roof-Plants-Resource-Planting/dp/0881927872/ref=sr\\_1\\_1?ie=UTF8&s=books&qid=1247167922&sr=8-1](http://www.amazon.com/Green-Roof-Plants-Resource-Planting/dp/0881927872/ref=sr_1_1?ie=UTF8&s=books&qid=1247167922&sr=8-1)

#### **Green Roof Construction and Maintenance**

by Kelly Lockett

[http://www.amazon.com/Green-Construction-Maintenance-GreenSource-Books/dp/007160880X/ref=sr\\_1\\_2?ie=UTF8&s=books&qid=1247167922&sr=8-2](http://www.amazon.com/Green-Construction-Maintenance-GreenSource-Books/dp/007160880X/ref=sr_1_2?ie=UTF8&s=books&qid=1247167922&sr=8-2)

#### **Planting Green Roofs and Living Walls (Hardcover)**

by Nigel Dunnett and Noël Kingsbury

[http://www.amazon.com/Planting-Green-Roofs-Living-Walls/dp/0881929115/ref=sr\\_1\\_4?ie=UTF8&s=books&qid=1247167922&sr=8-4](http://www.amazon.com/Planting-Green-Roofs-Living-Walls/dp/0881929115/ref=sr_1_4?ie=UTF8&s=books&qid=1247167922&sr=8-4)

#### **Award Winning Green Roof Designs**

by Steven Peck

[http://www.amazon.com/Award-Winning-Green-Designs-Schiffer/dp/0764330225/ref=sr\\_1\\_5?ie=UTF8&s=books&qid=1247167922&sr=8-5](http://www.amazon.com/Award-Winning-Green-Designs-Schiffer/dp/0764330225/ref=sr_1_5?ie=UTF8&s=books&qid=1247167922&sr=8-5)

#### **Green Roof Construction and Maintenance**

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[http://www.amazon.com/Green-Construction-Maintenance-GreenSource-ebook/dp/B002FOT53M/ref=sr\\_1\\_6?ie=UTF8&s=books&qid=1247167922&sr=8-6](http://www.amazon.com/Green-Construction-Maintenance-GreenSource-ebook/dp/B002FOT53M/ref=sr_1_6?ie=UTF8&s=books&qid=1247167922&sr=8-6)

#### **Green Roofs in Sustainable Landscape Design**

by Steven L. Cantor

[http://www.amazon.com/Green-Roofs-Sustainable-Landscape-Design/dp/0393731685/ref=sr\\_1\\_7?ie=UTF8&s=books&qid=1247167922&sr=8-7](http://www.amazon.com/Green-Roofs-Sustainable-Landscape-Design/dp/0393731685/ref=sr_1_7?ie=UTF8&s=books&qid=1247167922&sr=8-7)

#### **Green Roofs: Ecological Design And Construction (Hardcover)**

by Earth Pledge Foundation

[http://www.amazon.com/Green-Roofs-Ecological-Design-Construction/dp/0764321897/ref=sr\\_1\\_8?ie=UTF8&s=books&qid=1247167922&sr=8-8](http://www.amazon.com/Green-Roofs-Ecological-Design-Construction/dp/0764321897/ref=sr_1_8?ie=UTF8&s=books&qid=1247167922&sr=8-8)

#### **Roof Gardens: History, Design, and Construction**

by Theodore H. Osmundson

[http://www.amazon.com/Roof-Gardens-Construction-Architects-Designers/dp/0393730123/ref=sr\\_1\\_8?ie=UTF8&s=books&qid=1247168418&sr=1-8](http://www.amazon.com/Roof-Gardens-Construction-Architects-Designers/dp/0393730123/ref=sr_1_8?ie=UTF8&s=books&qid=1247168418&sr=1-8)

#### **Green Roof Systems : A Guide to the Planning, Design and Construction of Building Over Structure**

by Susan Weiler and Katrin Scholz-Barth

[http://www.amazon.com/Green-Roof-Systems-Construction-Structure/dp/0471674958/ref=sr\\_1\\_9?ie=UTF8&s=books&qid=1247168418&sr=1-9](http://www.amazon.com/Green-Roof-Systems-Construction-Structure/dp/0471674958/ref=sr_1_9?ie=UTF8&s=books&qid=1247168418&sr=1-9)

## Products:

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### **Hydrotech Garden Roof Systems**

American Hydrotech, Inc., located in Chicago, IL, is a producer and distributor of waterproofing and roofing products. Hydrotech supplied the products used for one of the largest green roofs in the world, Millennium Park. Hydrotech introduced the Garden Roof Assembly system in 1997; the system is currently available in four different assemblies: the Extensive Garden Roof, the Sloped Garden Roof Assembly, the Shallow-Intensive Garden Roof Assembly, and the Intensive Garden Roof.

## Case Studies:

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### **Millennium Park**

Located in downtown Chicago, IL, Millennium Park is considered to be the largest intensive green roof in the world. The 24.5 acre park spans two sub-grade parking garages and an existing rail yard and features Frank Gehry's Jay Pritzker Pavilion, the Crown Fountain by Jaume Plensa, the Lurie Garden, and Anish Kapoor's Cloud Gate. The site was originally owned by the Illinois Central Railroad and was considered to be untouchable for nearly 150 years: the larger Grant Park was designed around the railway.

### **Chicago Center for Green Technology**

CCGT, located west of Chicago's Loop, acts as a model for green construction, houses green businesses and organizations, and provides a place to learn about sustainability. It is only the third building in the United States to be designed with the highest standards of green technology, LEED Platinum, though it is the first LEED Platinum building to reuse an existing structure and provide public transportation. The building that houses CCGT was built in 1952 and was most recently owned by Sacramento Crusing.

## References:

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Scholz-Barth, Katrin. "From Grey to Green: Environmental Benefits of Green Roofs"  
in *Green Roofs: Ecological Design and Construction*, ed. Siena Chrisman. Atglen,  
PA: Schiffer Publishing Ltd., 2005.