The Valuation of Bridgeport Parks

green
PARK CITY
bridgeport, CT

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Executive Summary

Bridgeport's new Parks Master Plan envisions a city which connects its neighborhoods to its waterfront and open spaces
(Source: Sasaki)

2014 Valuation of Bridgeport Parks

Urban land is a scarce commodity that faces competition for development. Each year it seems that a new restaurant, store, or apartment complex appears. Urban planners attempt to maximize the use of urban space by making it denser, but would that necessarily make urban centers more economically productive? Possibly, however, it would come at the expense of losing the services that open spaces and natural amenities provide. It is difficult to compare the economic benefits of development versus conservation of urban land, mostly because the benefits come in two completely different currencies. The value of developed land is relatively simple to quantify: What is the cost of rent per square foot of space? How much tax revenue can a new building generate? The value of open space is much harder to understand because its natural processes are dynamic.

This report aims to demonstrate the dollar value of the dynamic natural benefits of the parks system for the City of Bridgeport, Connecticut. Bridgeport is one of the smallest cities in Connecticut with just 16 square miles of land area. It is also one of the densest in Connecticut, with a population of 9,151 per square mile. Even so, the City boasts one of Connecticut's most comprehensive urban park systems, and is known colloquially as "The Park City." The value of each benefit the City's parks provide is broken down into several categories in this report. They are listed as follows:

Property Values: How values of adjacent properties are affected.

Water Resources: How natural filtering and buffering of storm water reduces Bridgeport residents' water treatment costs.

Air Quality: How urban trees improve the quality of air for citizens.

Physical Fitness Resources: How parkland can be used to improve health through physical activity.

Volunteerism: How community groups and volunteers utilize parks to provide economic benefits to the larger community.

When all of these factors are added together, parks contribute significantly to the city in ways that require more detailed study - as this report addresses. Parks are not only a resource for individuals who enjoy nature, but a source of economic stimulus for the community as a whole.

www.BGreenBridgeport.org

Bridgeport Parks: An important economic engine for the city.

In 1856, Fredrick Law Olmsted, one of the architects who made Central Park what it is today, began a study on how the park affected the values of properties immediately adjacent to it in order to justify the $13,000,000 spent on the park's construction. In a 17 year period, the return on investment was worth 16 times over, with these properties gaining $209,000,000 in value (APA 1). In 2014 dollars, that value is over $4 billion.

To calculate the added value of Bridgeport parks, the value of properties which are in the vicinity of parks can be compared to the value of properties farther away from parks. Residential properties located within one tenth of a mile from a park in Bridgeport have, on average, an 8% higher property value than residential properties located within the next tenth from a park. Commercial properties show an even greater gain in property value within the first tenth of a mile from a park, showing an 11% increase compared to properties in the second tenth of a mile from a park. Below is a map illustrating the two buffer zones surrounding the Bridgeport parks:
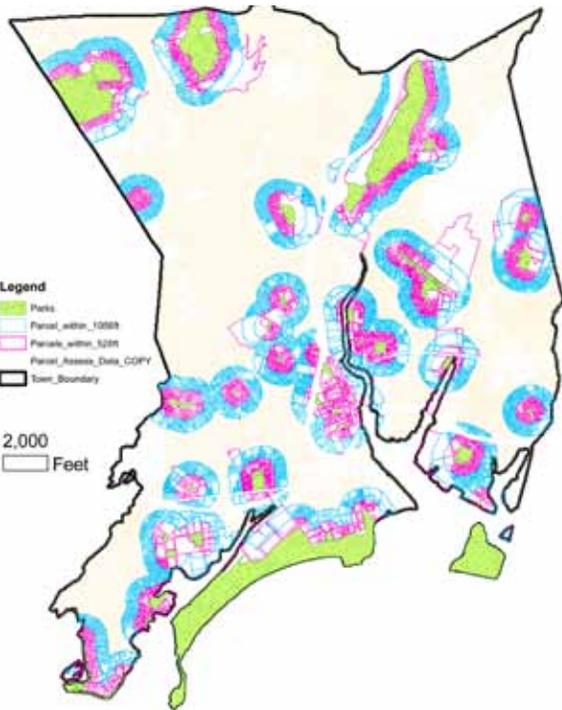
A Map Showing Properties within 1/10th and 2/10ths of a mile from Bridgeport Parks
(Source: City of Bridgeport GIS)

> **17 years after the creation of Central Park, values of adjacent properties had increased over $4 billion.**

New York City Central Park
(Source: Wikipediai)

Properties Within the First Tenth of a Mile			
	Total parcels	Sum Value	Average Value
Residential	3,819	$837,384,615	$219,268
Commerical	305	$1,343,874,039	$4,406,144

Properties Within the Second Tenth of a Mile			
	Total Parcels	Sum Values	Average Value
Residential	5,800	$1,174,026,118	$202,418
Commerical	351	$1,390,784,961	$3,962,350

Property Values Increase Within 1/10 of a Park			
	% Value Increase	Avg. Value Increase	Tot. Value Increase
Residential	8%	$16,850	$64,349,146
Commerical	11%	$443,794	$135,357,193

A scenic Bridgeport Park
(Source: Bridgeport Park Services)

> **All properties within one-tenth of a mile of Bridgeport parks are on average worth 9.5% more than those within the next tenth of a mile. This adds up to a collective increased value of $200 million.**

Property Values

Ensuring the Bridgeport City Park System is well functioning is critical to maximize the benefits of increased property values in Bridgeport as dysfunctional parks can significantly harm the value of surrounding properties. Bryant Park in New York City is a perfect example of how investment in parkland can turn an undesirable location associated with underperforming parkland into a hotbed of economic activity. In the 1970s and 1980s Bryant Park was known for drugs and crime. In 2001, after a decade-long renovation and $30 million in public and private funding, the neighborhoods near Bryant Park experienced a renaissance. Commercial rental values increased by approximately 225% (NYFP 5). While Bridgeport is different than New York City, the economic factors are the same. Properly managed neighborhood green space with adequate capital allocations and community partners can have a significant impact on the adjacent property values within a neighborhood.

Bryant Park New York City
(Source: Wikipedia)

Community investment in NYC's Bryant Park has increased the park's commercial rental parcels by 225%.

Water Resources

While cities have man-made technology to filter and re-use water, working with nature to treat water has many benefits. Significant savings can be realized by using green infrastructure and natural processes to treat stormwater . Green infrastructure is a broad term that can be applied to any installation that helps water soak into the ground as it

would in a natural setting. Parks can be thought of as large scale green infrastructure installations. Green infrastructure in parks takes on the forms of riparian buffer restoration, stream preservation, tree plantings, and open space that help rainwater infiltrate into the ground. Along with significant monetary savings from day-to-day filtering costs, Bridgeport's parks protect the city's public and private infrastructure from the effects of severe storm events. Seaside Park in the South End Neighborhood played a critical role in protecting Bridgeport's seaside community during Hurricane Sandy. Similar waterfront parks in Bridgeport act as a natural shield against rising tides, heavy rain, and flooding.

Knowlton park protects the East Side neighborhood from flooding
(Source: City of Bridgeport)

The majority of stormwater runoff in Bridgeport is treated in conjunction with waste water through a combined sewer system. In 2012's fiscal year, the city's Water Pollution Control Authority (WPCA) treated over 10 billion gallons of runoff and wastewater from Bridgeport, costing the city's taxpayers $10,615,452. Of this water, 64% came from runoff of storm water. That means that over half of the water treated in the WPCA treatment plant isn't used by its citizens. For every drop of stormwater that doesn't enter the WPCA sewer system and instead infiltrates into the ground via green infrastructure, the city saves money, improves local water quality, and adds a public amenity. Therefore natural surfaces found in the Bridgeport parks system in the form of riparian buffers, preservation, tree plantings and open space help save the city money. To determine the actual permeability of Bridgeport's park and developed land, one can assume that similar cities share similar values. The Trust For Public Land, or TPL, created a report that found Philadelphia's park land is 81.3% permeable, meaning that 81.3% of rainwater was absorbed into the ground, while 18.7% of rainwater ran off of the parks into streams or roads, and subsequently into the wastewater treatment plant. On the other hand, the rest of Philadelphia's city land has a permeability of 34.9%. Approximately 65.1% of rainfall received on this land needs to be treated by the wastewater treatment plant (TPL 12). One can take these values and incorporate them into an equation with values we already know about Bridgeport, such as acres of parkland, annual rainfall and how much money it costs for Bridgeport's WPCA to treat one gallon of water. If we woke up tomorrow, and someone had developed all of Bridgeport's parkland, this would add 729,900,000 gallons of water to the volume that the WPCA already treats per year, and Bridgeport taxpayers would collectively pay $751,289 more in water treatment related taxes every year.

If we woke up tomorrow and someone had developed all of Bridgeport's parkland, this would add 729,900,000 gallons of water to the volume that the Water Pollution Control Authority treats each year. Adding $751,289 collectively to the water treatment bills of residents.

| Precipitation For Typical Bridgeport Year: 42.75 inches	
Annual Precipitation over Bridgeport	1,588,000,000 cu ft
Annual precipitation on parks	210,300,000 cu ft
Amount of acutal runoff from parks (81.3% permeable)	39,330,000 cu ft
Runoff if parks acerage was the same permeability as the other areas of the (34.9% permeable)	136,900,00 cu ft
Reduction in runoff due to park-land's perviousness	97,570,000 cu ft
Cost to treat 1 cu ft of water	$0.0077
Total savings due to park runoff reduction	$751,289

Residents digging a bioswale
(Source: City of Bridgeport)

New York City's (NYC) Staten Island Bluebelt Project has utilized nature to remediate their stormwater issues. NYC has constructed a network of streams to channel stormwater from streets into catchment areas. These streams treat storm water run-off using natural processes called bio-remediation. Not only does the "bluebelt" create urban greenspace for residents to enjoy, but these installations are less expensive than building sewer systems. The Bluebelt Project had an estimated price tag of $37.5 million. This was less than half of the projected price of a new sewer system that could handle the same capacity of water (NYC Environmental Protection 1).

In a major runoff diversion project, New York City reduced their expense by half by using green infrastructure.
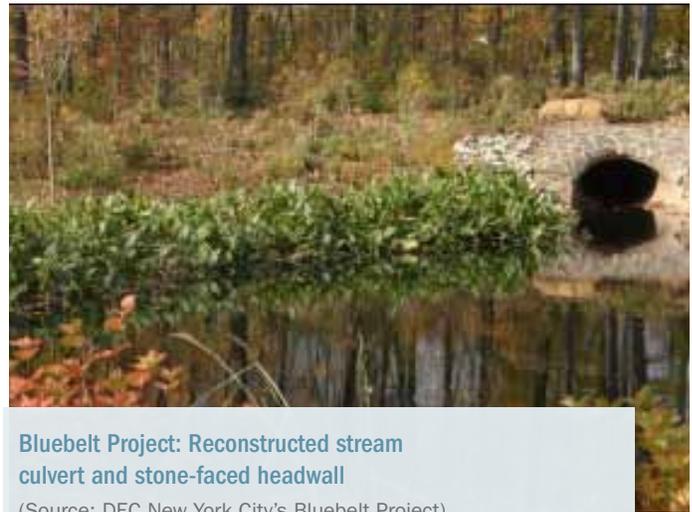
Bluebelt Project: Reconstructed stream culvert and stone-faced headwall
(Source: DEC New York City's Bluebelt Project)

Air Quality

Bad air quality can come from any number of anthropogenic sources. Parks and green spaces offset these impacts. Vehicles are a significant contributor to air pollution, especially when they are in an idle state. A vehicle which is in an idle state generates 20 times more air pollutants than when the vehicle is travelling at 30 miles per hour. That air pollution is also concentrated around where the car is idling, and can aggravate asthma, allergies, and cardiovascular disease. Idling cars also cause regional acid rain and haze. A Connecticut state law prohibits cars from idling for any more than three minutes (DEEP 1). Sikorsky Memorial Airport is another major contributor to vehicular air pollution, being the closest airport to Bridgeport. Bridgeport also contains stationary sources (point-sources) of air pollution, such as dry cleaners, factories, and power plants. Below is a list of common air pollutants and their effects on health:

- **Carbon dioxide:** reduces the dissolved oxygen level in blood, hampering organ's ability to function.
- **Nitrogen dioxide:** airway inflammation and increased respiratory symptoms for those with asthma.
- **Ozone:** irritates airways causing coughing and shortness of breath. Can aggravate asthma and other lung diseases.
- **Particulate matter:** health complications for those with heart or lung disease, nonfatal heart attacks, health complications, aggravated asthma, coughing, wheezing, decreased lung function, and respiratory burning sensation
- **Sulfur dioxide:** constriction of airways in lungs, asthmatic complications(EPA 1).

Bridgeport's trees act as a filter for these pollutants, breaking them down into non-toxic substances through photosynthesis. According to a study conducted jointly by the City of Bridgeport, the University of Vermont Spatial Analysis Lab, the United States Forestry Service, and the United States Department of Agriculture Northern Research Lab, the City of Bridgeport has 2,765 acres of tree canopy cover. This represents 27% of the land area of Bridgeport. Cities that have similar percentages of tree cover are Baltimore, Maryland, Des Moines, Iowa, and Cambridge, Massachusetts (UVM 1). Bridgeport's current tree canopy removes $860,405 worth of air pollutants annually. The study concluded that 72% of the land area of Bridgeport was fit for tree cover, but that 45% of this land did not contain tree cover (UVM 1). If Bridgeport's total tree canopy was increased to 72%, $2,294,111 worth of air pollutants would be removed annually.

Seaside Park Tree Canopy Filters the Air
(Source: Wikipedia)

The USDA Northern Research Lab has created a calculator to measure the exact quantities in pounds for each of the common air pollutants that trees in cities remove, based on how large a city is and what percentage of tree cover the city has. The monetary values are median of externality values for each pollutant, externalities being costs related to global climate change, health issues, etc. Below are the breakdowns of values of Bridgeport's tree cover's filtering of air pollutants (USDA 1):

Annual Air Pollution Removal Value of Current 27% Tree Canopy in Bridgeport, CT			
Pollutant Type	Pounds of pollutant removed	Service value per short ton removed	Total pollutant removal value
Carbon dioxide	7,518	$1,392	$5,233
Nitrogen dioxide	38,877	$9,801	$190,517
Ozone	83,755	$9,801	$410,441
Particulate matter	70,135	$6,544	$229,482
Sulfur dioxide	20,610	$2,400	$24,732
Total	220,895	-	$860,405

Elton Rogers Park
(Source: City of Bridgeport)

Annual Air Pollution Removal Value of Possible 72% Tree Canopy in Bridgeport, CT			
Pollutant Type	Pounds of pollutant removed	Service value per short ton removed	Total pollutant removal value
Carbon dioxide	20,049	$1,392	$13,954
Nitrogen dioxide	103,673	$9,801	$508,050
Ozone	223,346	$9,801	1,094,507
Particulate matter	187,026	$6,544	$611,949
Sulfur dioxide	54,959	$2,400	$65,951
Total	589,053	-	$2,294,111

Note: Original service value per short ton removed provided by the USDA calculator in 1994 dollar value. Values in chart adjusted to match 2014 inflation(BLS 1).

Bridgeport's current tree canopy removes $860,405 worth of air pollutants annually. Bridgeport's land has the ability to host a tree canopy which will remove $2,294,411 worth of air pollutants annually.

Physical Fitness Resources

There are 9.3 acres of green, open parkland for every 1000 Bridgeport residents, totaling up to 1356 acres of parks. 88% of residents live within a 10 minute walk to one of Bridgeport's 46 parks. Bridgeport's parks facilities offer a multitude of recreational activities. These include a 320 acre golf course, 19 playgrounds, 24 tennis courts, 11 basketball courts, 25 baseball/softball fields, 17 football/soccer fields, a bocce court, an ice skating facility, 20 acres of beaches, and 8 miles of walking/running/biking trails (COB 239). With all of these amenities, it is easy to get 150 minutes per week of moderate intensity physical activity recommended by the Center for Disease Control for adults, while children are recommended to have 60 minutes of physical activity per day (CDC, How Much... 1). Exercising regularly helps to balance calories and achieve or maintain a healthy weight, helps control blood glucose levels, reducing the risk of Type 2 diabetes and controlling symptoms, and reduces the risk of cardiovascular disease and cancers of the colon and breasts(CDC, Physical Activity...1). A study published in The Physician and Sportsmedicine conducted a cross section of the US National Medical Expenditures Survey to find some key factors that made a difference in how much individuals spent on their medical bills. The study found that people who exercised regularly had an average annual healthcare cost of $1,019, while those who were not physically active spent an average of $1,349. This is a difference of $330 in 1987, worth about $688 in 2014 when adjusted for inflation(BLS1)(The Physician and Sportsmedicine 1).

Residents who exercise regularly at Bridgeport parks on average spend $688 less on medical costs than those who are not physically active.

From 2012 to 2014, volunteers in Bridgeport parks provided over $10,211,891 worth of services.

Volunteerism

Active involvement in the maintenance and preservation of community amenities provides economic and social benefits to the entire community. It cuts costs to maintain parks and promotes bonding among individuals in the community who work together as stewards of their communal space. The park system offers a great opportunity for community participation.

According to estimates made by the Park City Schools and Community Alliance, approximately 386,375 hours of documented community service in the Bridgeport City Park System took place between the beginning of April 2012 and the end of May 2014. Services included activities such as tree planting, landscaping, shoreline cleanups, and beautification projects. In 2013, Independent Sector determined that one hour of community service dedicated to a non-profit has an economic benefit of $26.43 in the State of Connecticut(Independent Sector 1). This was determined by calculating the average economic benefit of services provided by volunteers to non-profits with special focus on regional economics. In 25 months, parks volunteers have generated an estimated $10,211,891 economic benefit for the City of Bridgeport. This number is conservative, considering it does not take into consideration the volunteer hours generated by smaller Bridgeport non-profits, community groups, and Neighborhood Revitalization Zones.

Volunteering has increased since the development of the BGreen 2020 plan in 2010 by 60%(COB BGreen 2). This increasing trend of civic engagement is an optimistic indication that residents are more likely to look out not only for their local parks system, but also for their neighbor's contribution to the triple bottom line goals to improve the environment, crime, social equity, and economic situation of Bridgeport and it's residents.

Conclusion

Investments in parks contribute back to the community in a number of ways that are not easily quantifiable in financial terms. There are many other areas that show how parks benefit society that we have not quantified in this study. For example, the social well-being benefits that park venues provide for social interaction, the role they play in neighborhood security and crime reduction, educational benefits provided to young students for learning, and the increased tourism that occurs because of these destinations. These dynamic non-market forces play a significant role in how we spend our resources towards parks.

Triple bottom line investments are ways that benefit three areas: the environment, the economy, and social equity. Investing in parks addresses all three of these areas and translates into the biggest benefit-to-cost payout. Continued support of Bridgeport's park system will lead to bigger gains in not only parks, but the city's economy as a whole.

Equity

Economics

SUSTAINABILITY
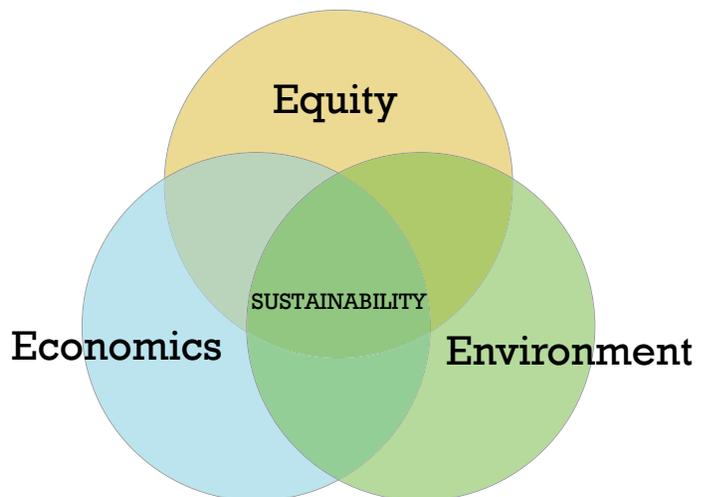
Environment

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Parks Master Plan • Air Quality Bioswale • Urban Park System •Rainfall Water Resources • Property Values Volunteerism • Green Infrastructure • Stream Preservation • Riparian Buffer Exercise • Tree Planting • Stormwater • Permeability • Water Pollution Control Authority • Wildlife Air Pollution • Exercise • Communal Space• Tree Canopy • Air Quality •Bioswale • Parks Master Plan • Air Quality Bioswale • Urban Park System • Rainfall Water Resources • Property Values Volunteerism • Green Infrastructure Stream Preservation • Riparian Buffer Exercise • Tree Planting • Stormwater Permeability • Water Pollution Control Authority • Wildlife • Air Pollution Exercise • Communal Space • Tree Canopy • Air Quality • Bioswale • Water Resources • Property Values