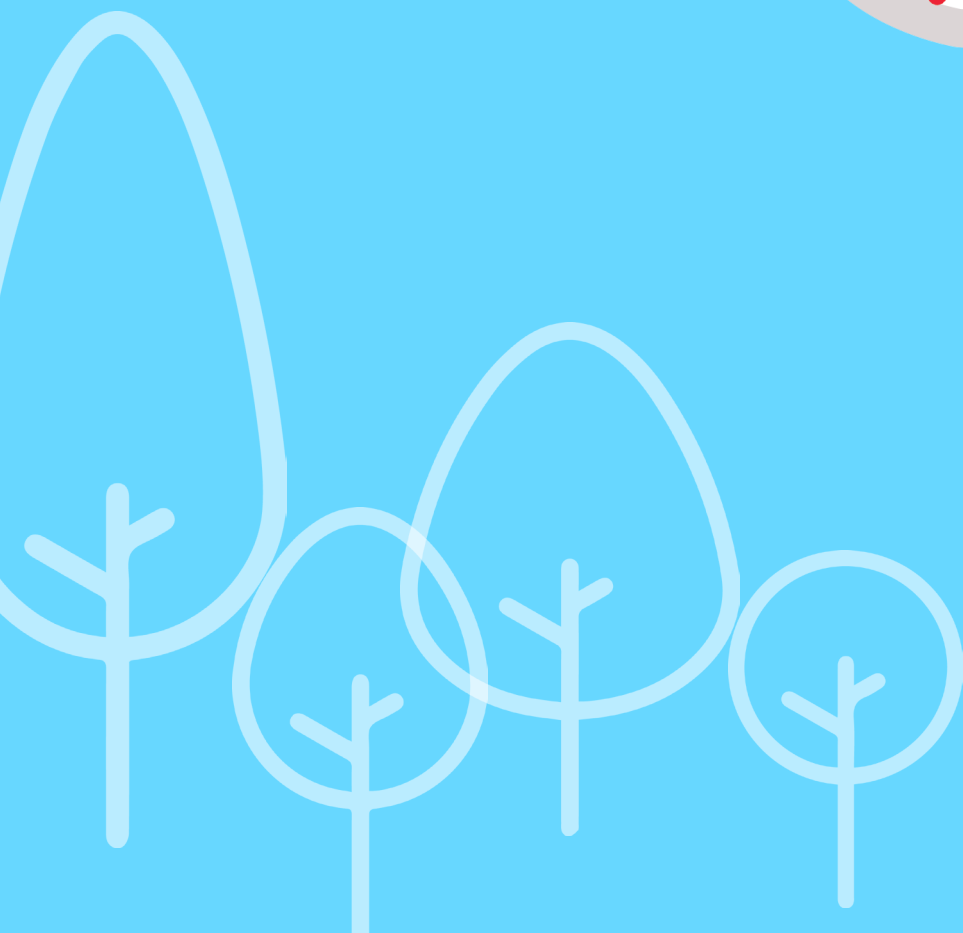


smart parks



Foreword

Parks are essential to our cities, and they are valuable. They are beneficial not only for our health, our environment, and our community, but also for the economy.

In our work with cities across the U.S., we identified a need for better tools to measure the positive impact of parks. We believe that with the right technology and data, park users and park champions can more effectively communicate the value of parks, empowering them to achieve and extend the goals of parks departments. At Soofa, we are dedicated to creating smart, sustainable, and social cities. Parks and public space, in general, have a significant role in determining how welcoming and healthy a city is. We created this white paper to emphasize the scale of parks' influence and the importance of innovating in public space. Turning to technology and new uses for parks will be of even greater importance, as parks fight for funding due to budget cuts and aging infrastructure needs.

We love parks and technology, and we want to make sure they are combined in a way beneficial to us all.

I hope you enjoy this read as much as I do.

A handwritten signature in black ink, appearing to read 'S. Richter', with a stylized flourish at the end.

Sandra Richter
President and CEO Soofa

Acknowledgments

This is the first white paper in our Smart City Research Series. Our next topic will focus on the Digital Divide. We are looking for collaborators who are spear heading technologies and policies that improve Digital Equity. Please reach out to us to be part of the conversation.

For leading the research on Smart Parks at Soofa, we want to thank Isabel Munson who brings various perspectives together for an in-depth but broad overview on our valuable public places.

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page title

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Executive Summary

Public space plays an important role in defining the flavor of the city. The need for public space and the value of parks has only grown as environmental and societal changes exacerbate issues that parks improve.

Parks have assets, budgets, revenue, employees, and huge “customer” bases—all features of a business. Despite this, they don’t quite behave like businesses, especially when it comes to analytics and innovation. In order to increase park revenue and access to parks, parks departments ought to focus on metrics, marketing, and R&D. Doing so will help them grow, duly helping the economy, the fabric of the surrounding communities, and the environment.

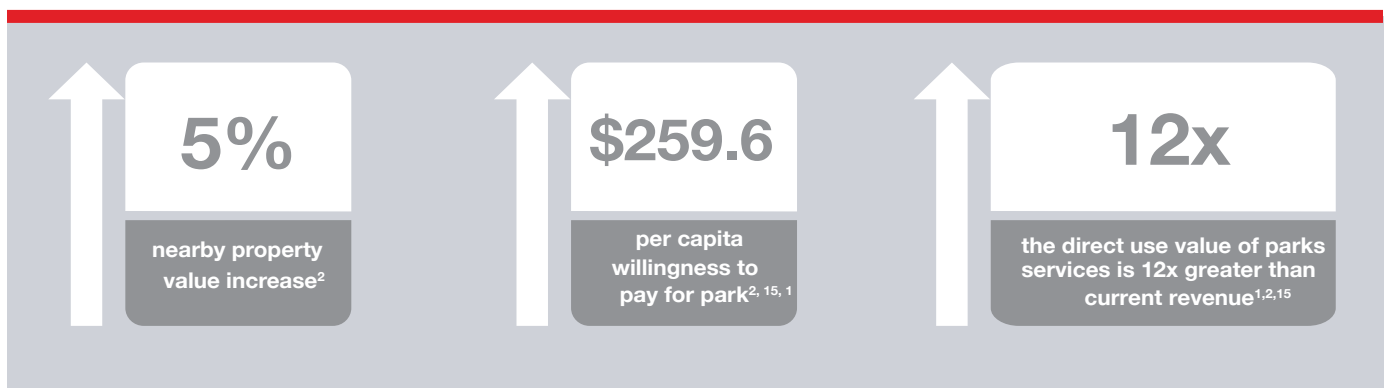
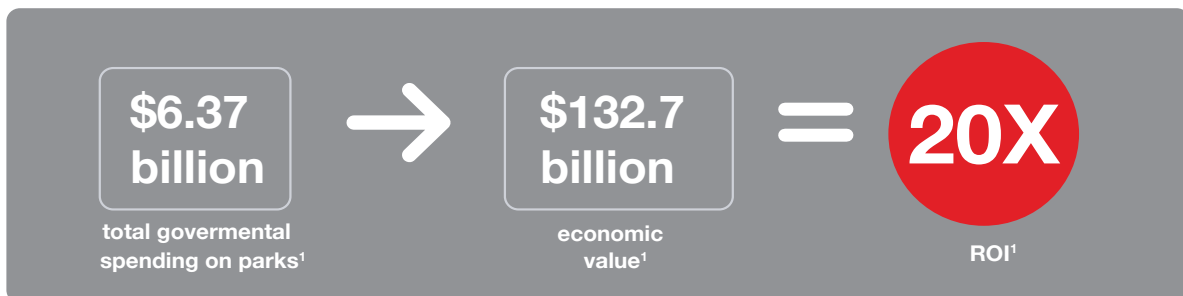
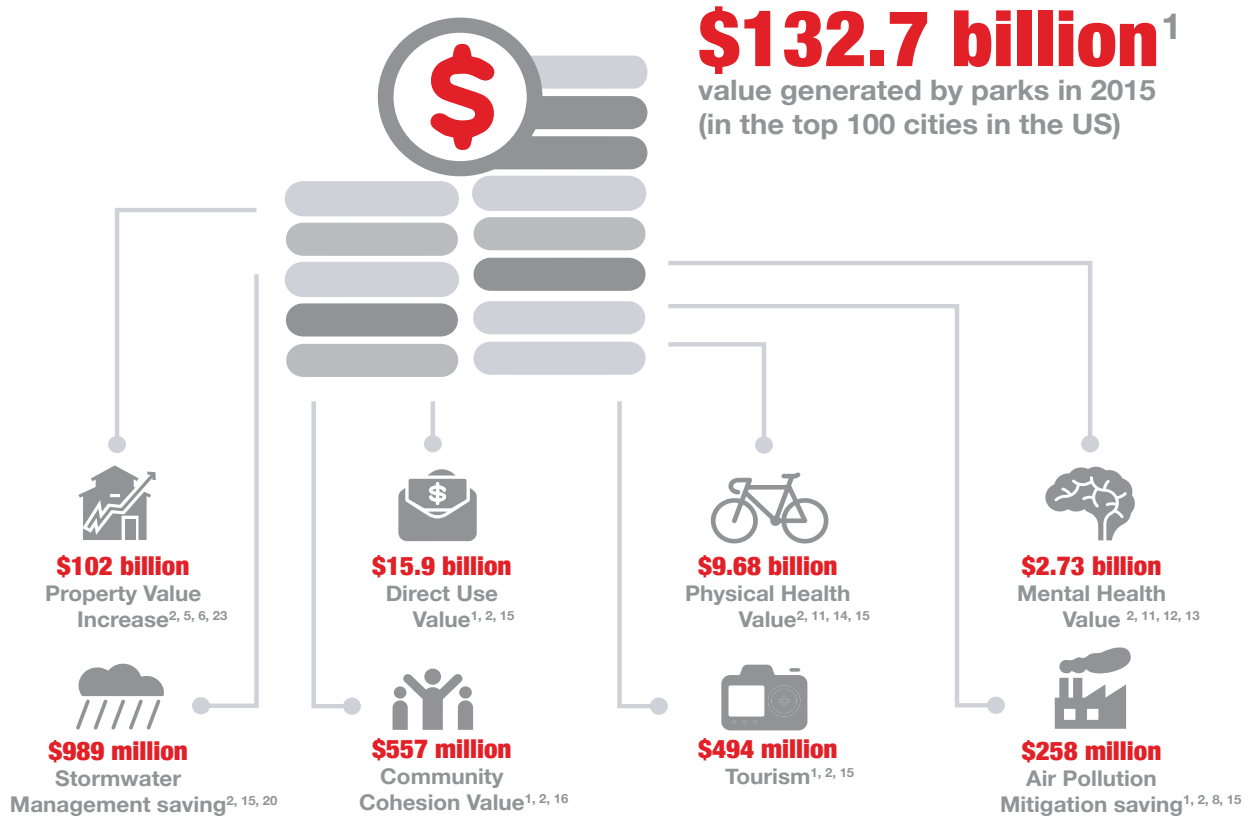
According to the Trust for Public Land, the total amount spent on parks and recreation by the 100 largest U.S. cities was \$6.37 billion¹ in 2015, while our estimate of the economic benefit of parks is \$132.7 billion. This would indicate that every dollar spent on parks and recreation yields \$20.84 worth of economic benefits. The economic benefits of parks are direct and indirect, from tourism and property value to stormwater management and community cohesion. Altogether, they add up to billions of dollars. Though values vary depending on the park, parks are responsible for an average 5% of property value for homes within 500 feet.²

Parks generate \$21.21 in revenue per capita, while they spend \$88.51 per capita.³ Thus, parks are generating income covering an impressive one quarter of their costs. Furthermore, the per capita direct use value of parks is \$259.62. The amount residents value parks—the direct use value—is twelve times the revenue, meaning a large share of potential revenue has yet to be captured. What’s more, using the median spending values in the U.S., for each dollar spent on parks, there is \$4.76 of direct use value.

Parks can use these valuation figures and comparative data to advocate for funding and better assess their needs. Given the infrastructure deficit in the U.S., parks will have to fight harder for funding and turn to innovative ways of generating income.



PARKS BY NUMBERS



1. Trust for Public Land - 2015 City Park Facts Report and Data Sheets
2. Trust for Public Land - Measuring the Economic Value of a City Park System
5. Measuring Parks Impacts on Property Values
6. National Parks Service - Real Property Values
7. Environmental Defense Fund - Clean Air Act - Saving Lives and Reducing Healthcare Costs
8. US Forest Service - Air Pollution Removal by Urban Trees and Shrubs in the United States
11. The Trust for Public Land - The Health Benefits of Parks
12. Medical and productivity costs of anxiety disorders: case control study
13. National Institute of Mental Health - Any Anxiety Disorder Among Adults

14. State of Obesity - The Healthcare Costs of Obesity
15. The Trust for Public Land Economic Benefits Reports: San Francisco, Virginia Beach, Mecklenburg, Denver
20. Wastewater Spending Costs - US Conference of Mayors - Mayors Water Council
"Trends in Local Government Expenditures on Public Water and Wastewater Services..."
16. Value of Volunteer Time - Independent Sector
23. US Census Bureau - Characteristics of New Housing, 2014
Icons thanks to: Kenneth Appiah, Ryan Beck, Eugene Maksymchuk, Creative Stall, Daouna Jeona. Icon 54. Amelia Wattenbarger

Introduction

Parks are an integral part of cities. The fiscal, social, and health benefits—among others—are huge, and the total spend on parks is significant. Parks are a huge market in America, but many parks don't know, let alone respond to, their audience. What other business acts in this way?

Currently, parks and recreation departments conduct business in roughly the same way they always have. There is a relatively low bar for innovation in parks, which translates to a lower appetite for, and tolerance of, risk and change. Why is there such a gap between how we approach the study and business of public goods compared to private goods? Topically, profit is an explanation for why parks departments don't behave like private entities. But underneath, the difference reflects societal values and prioritization. Despite the huge benefits of parks, they are low on the public priority list.

This white paper provides an extensive estimate of the economic benefits of parks, the financials of parks, key success metrics, and examples of innovation. We approach the study of parks from a business perspective, based on their scale, value, benefits, and future market challenges. All of this information stands to support the conclusion that we need smarter, more innovative parks in order to keep providing this important public good. Understanding the current state of parks is the first step towards creating public spaces geared to improve the lives of all residents.

Understanding the current state of parks is the first step towards creating public spaces geared to improve the lives of all residents.

At Soofa, we are dedicated to creating smart, sustainable, and social cities. Public space has a huge role in determining how welcoming and healthy a city is. We created this white paper to emphasize the scale of parks' influence and the importance of innovating in public space. Turning to technology and new uses for parks will be of even greater importance as parks fight for funding due to infrastructure needs. Parks can act like businesses in order to continue providing their services.

The Importance of Parks

Parks and public spaces are an integral to the feel of city. More than that, though, they have a massive financial impact:

Parks increase the property values of surrounding homes, which generates more property tax for the government. They reduce air pollution and aid with stormwater management, both of which save money. Green space helps to encourage active lifestyles and reduce stress, in turn reducing healthcare costs.

Tourists to notable parks generate additional income for businesses and the government. The influx of visitors for parks and the intersection of different people in parks creates social capital and feelings of community.

The study of the economic value of parks is new, but important. Too often, parks are regarded as stagnant objects, only viewing the surrounding urban activity rather than motivating it. To consider parks a sunk cost is erroneous. Once a park is built and invested in, the money isn't just thrown towards recreation. Parks are an asset that generate savings and income for numerous different industries. This section covers the financial rewards brought about by urban parks.

Parks are an asset that generates savings and income for numerous industries.



increase
real estate
tax revenue



reduce civic
operational
costs



reduce
health
care costs

Parks & Property Values

Parks have a positive impact on the property values of surrounding homes. Some refer to this premium as “hedonic value”: an increase in willingness to pay due to proximity to desired locations. The phenomenon of hedonic value is present not only for parks, but also for schools, public transportation, police stations, libraries, or even friends’ homes and workplaces.

Studies are relatively limited, typically covering only one town or area. This is due to the complexity in determining property value increases for one park, let alone all the parks in the country. Results demonstrate, however, that proximity to a park increases the home value by 2-22%. Increases in value mostly take place within 500 feet of a park.² It is estimated that 85% of an urban park’s value occurs within 800 feet of its edge.⁵

The hedonic value of a park is dependent on how nice a park is and its size. Generally speaking, though, **a park can reasonably be estimated to account for 5% of the value of homes within 500 feet.**² Famous parks and those with additional resources, such as pools, tennis courts, or cultural activities, can have much higher premiums. By our estimate, an average park generates \$4.57 million of hedonic value.

Valuation Methodology

Using the 5% hedonic value figure, an estimate of the total property value generated by parks may be calculated. The total acres of parkland are divided by the total number of parks to indicate the average park area. These figures are all for the 100 largest American cities, as the authority for park reporting, The Trust for Public Land, only provides data for the 100 largest cities. From the average park area, perimeter estimates may be made, and using the average lot size and house price, the number of homes and their value may be determined. To

Parks and Property Values ^{23,1}

Median Lot Size	\$8,689
Median Home Sales Price	\$282,800
Homes Within 500 Feet	\$323
Total Home Value for 1 Park	\$91,307,597
Hedonic Value for 1 Park	\$4,565,380
Total Hedonic Value (U.S.)	\$102,054,501,411
Tax Revenue at .5% Rate	\$510,272,507
Tax Revenue at 1% Rate	\$1,020,545,014

By our estimate, an average park generates \$4.57 million of hedonic value.

Parks and Property Values: Case Studies

Washington, D.C.: The Trust for Public Land found in 2006 that parks generated \$1,198,858,025 of value for residential properties nearby. Given the effective property tax rate at the time, parks generated \$6,953,377 in additional property tax revenue for the city.²

Chattanooga, TN: In the early 1980s this city was facing rising unemployment and crime, polluted air, and a deteriorating quality of life. To lure middle-class residents back, local government, businesses, and community groups decided to improve the quality of life by cleaning the air, acquiring open space, and creating parks and trails. As a result, property values rose to more than \$11 million, an increase of 127.5 percent.⁴

Atlanta: After the Centennial Olympic Park was built, adjacent condominium prices rose from \$115 to \$250 per square foot.⁴

Dallas: Homes facing parks were worth 22% more than homes half a mile away from an amenity. 85% of an urban park's positive property value is theorized to occur within 800 feet of its edge.⁵

Amherst, MA: Cluster housing with dedicated open space was found to appreciate at an annual rate of 22 percent, compared to a relative conventional sub-division's rate of 19.5 percent. In 1989 dollars, this difference equates to roughly \$17,000.

Austin: Neighborhoods adjacent to two greenbelts showed statistically significant increases in value for properties directly adjacent to the amenity, with greenbelt adjacency representing 6-12% of the value of all adjacent homes, and a total value of \$13.64 million.⁵

Indianapolis: Location within one-half mile of the Monon trail accounted for 15% of home sales value, and 2% for the other seven conservation corridors. The total value generated by the greenbelts was equal to \$166.5 million in 2003 dollars.⁵



Tourism

Notable parks often end up generating a large amount of income for cities and businesses. Take the Central Park, which has an **estimated 40 million visitors a year**. Parks with additional features, such as zoos, aquariums, museums, carnivals, and performers, can end up attracting tourists who come to the city solely for that park.

San Diego

A great example of the economic activity park tourism can generate is the City of San Diego, which boasts two of the top five most visited parks. In fact, Balboa Park is the biggest tourist attraction in San Diego. In a 2009 study, The Trust for Public Land estimated that visitors who came solely because of San Diego's parks spent \$114.4 million, generating \$8.58 million in tax revenue.²

If these figures are extended to other cities and notable parks, the total value of parks-based tourism is significant. **We estimate the total value of parks-based tourism in the 100 largest cities to be \$494.28 million.**

Additional Benefits

In addition to the direct fiscal value of parks tourism, having a stream of visitors into a city creates a more diverse cultural landscape. Innovation and economic development are encouraged by residing within a changing and dynamic environment. The “melting pot” phenomenon is an important one. More and more studies look into the impact of serendipity upon the development of ideas. Residing in an area with a constantly changing population—and their constantly changing needs—creates an environment ripe for inspiration, where people can interact with others from backgrounds of all types.

Having a stream of visitors into a city creates a more diverse cultural landscape.



Air Pollution

Trees and greenery absorb pollutants that damage the respiratory and cardiovascular systems, as well as structures around the city. Greater pollutant absorption results in lower pollution-related healthcare and maintenance costs.

The health care costs of pollution are large: for example, the Environmental Defense Fund estimates that the Clean Air Act will lead to over \$612 billion in healthcare costs saved from 2000 to 2020.⁷ These are sa-

vings coming from required reductions in emissions—estimates do not take into account how much money has already been saved due to trees' absorption.

Greenery absorbs a great deal of pollutants that otherwise cost a significant amount to clean up. While the total value of pollutants absorbed by greenery is probably much greater than money saved by the Clean Air Act, a conservative method of estimating value is by comparing the cost of human cleanup to the amount of pollutants trees absorb. The U.S. Forest Service Urban Forest Effects (UFORE) has produced calculators based on green coverage, pollutant and air flow specific to an area, and hourly pollution updates from the Environmental Protection Agency. Based on this calculator, it is estimated that Washington, D.C.'s parks removed air pollutants with a value of \$1.13 million in 2005.²

Our estimated value of pollution savings by parks in the 100 largest cities is \$258 million. The U.S. Forest Service puts the national figure much higher, at \$3.8 billion saved annually across the nation thanks to urban trees which translates to 711,000 tons of pollution.⁸

The US Forest Service estimates that \$3.8 billion is saved annually across the nation thanks to urban trees — 711,000 tons of pollution.



Stormwater

Stormwater management is a significant cost for cities, as improperly handled stormwater can cause ecological damage to waterways. Parks act as absorbent spaces for rainwater, reducing the load on city systems. The U.S. Forest Service Western Research Division in Davis, CA created a model that uses aerial photographs to calculate the value of retained stormwater runoff due to parks.

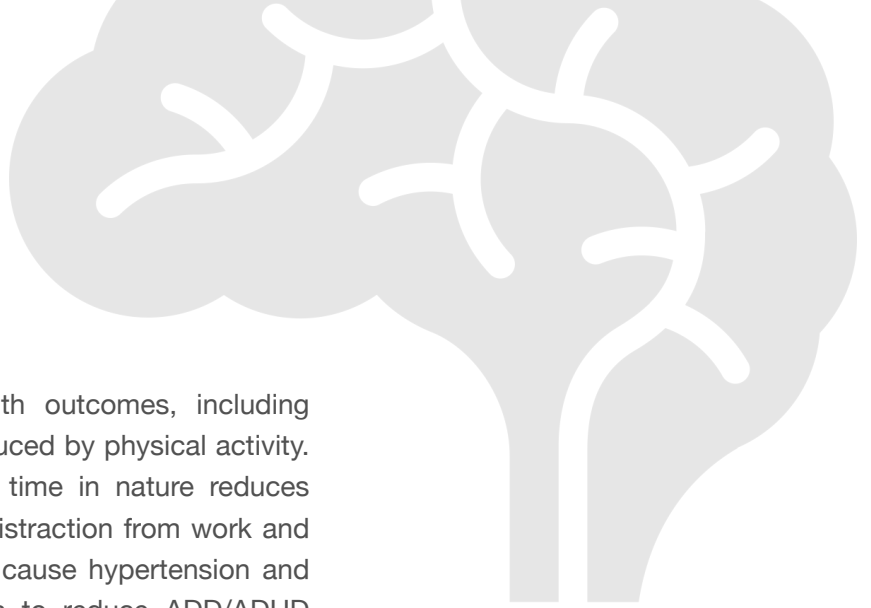
Using this model, the Trust for Public Land estimates that **the city of Philadelphia saves \$5.95 million a year in stormwater costs due to parks.**² For reference, their annual treatment budget is \$100 million. Philadelphia has 7 acres of parkland per 1,000 residents, which is toward the middle or lower part of the distribution. Cities with even higher figures, like Oakland at 15.1 acres per 1000 residents, Portland at 23.6, and Austin at 32.5, will save even more money thanks to green space.¹

Again, this number grows to a big savings when extended nationally. **We estimate the value of stormwater management by urban parks in the 100 largest U.S. cities to be \$989 million a year.**^{2, 20}

Parks act as absorbent spaces for rainwater, reducing the load and cost of city systems.



Mental Health



Parks help to reduce several negative health outcomes, including general stress and conditions prevented or reduced by physical activity. Numerous studies have found that spending time in nature reduces stress levels. Stress and anxiety often cause distraction from work and reduce productivity, and in the long term can cause hypertension and heart issues. Exposure to green space helps to reduce ADD/ADHD (and generally increase focus), lower blood pressure, expedite medical recovery, improve mood and sleep, and boost immune systems.^{9, 10, 11} Each of these conditions cost employees and healthcare systems billions of dollars a year. A city with more green space is a healthier city.

A 2001 study on residents of a Chicago housing project highlighted the impacts of nature on chronic mental fatigue stemming from stressful life problems and environments:

“Researchers found that residents with **even limited views of trees or grass from their apartments reported less mental fatigue, less procrastination in dealing with life issues, and feeling that their problems were less se-**

vere, more solvable, and of shorter duration than residents with no views of nature. Even small amounts of nature, such as a few trees and a bit of grass, were shown to have an impact.”¹¹

Exposure to green space helps reduce ADD/ADHD, lower blood pressure, expedite medical recovery, improve mood and sleep, and boost immune systems.

Cost of Anxiety

Reduced anxiety coming from green space can save private employers a great deal, too. A 2004 study indicated that employees with diagnosed anxiety conditions have a productivity cost of \$1,366.¹² About 40 million, or 18.1%, of Americans over the age of 18 have an anxiety disorder.¹³ If the 2004 study has an accurate cost for all these citizens, it represents a total cost of \$54.64 billion a year in anxiety-related productivity costs. Direct healthcare costs are substantial, as well. If exposure to parks and green spaces even reduced anxiety by 5%, which studies would indicate is a low number, **the productivity cost savings are \$2.73 billion a year.**

Physical Health

Adverse health conditions related to a lack of activity include heart disease, diabetes, and general obesity. Individuals without these conditions, and those who are active regularly, have lower healthcare costs. It is estimated that individuals who exercise regularly have yearly healthcare costs \$351 lower than those who do not, and \$702 less if they are 65 and older. Using these figures the Trust for Public Land estimates that Sacramento, CA saved \$19.9 million in healthcare costs during 2007 due to physical activity by park users.²

Obesity and conditions caused by obesity are estimated to cost \$147-\$210 billion in the U.S. yearly. Moreover, “obesity is associated with job absenteeism, costing approximately \$4.3 billion annually and with lower productivity while at work, costing employers \$506 per obese worker per year.”¹⁴ Parks improve likelihood to exercise, and therefore represent a factor that has reduced obesity costs:

Having an outdoor environment that encourages activity can reduce healthcare costs and increase productivity of employees.

“A group of studies re-viewed in the American Journal of Preventive Medicine showed that “creation of or **enhanced access to places for physical activity combined with informational outreach**” produced a **48.4 percent increase in the frequency of physical activity**”.¹¹

Having an outdoor environment that encourages activity can save a great deal in healthcare costs, as well as increase productivity of employees who feel rejuvenated by green space. The return on investment in encouraging physical activity (one method of which would be creating more parks and informational campaigns) is large:

“A 2008 study by the Urban Institute, The New York Academy of Medicine and TFAH found that an investment of \$10 per person in proven community-based programs to increase physical activity, improve nutrition and prevent smoking and other tobacco use could save the country more than \$16 billion annually within five years. **That’s a return of \$5.60 for every \$1 invested.**”¹⁴



Social Capital

Parks generate social capital in a variety of ways. At the most basic level, park activities and volunteer organizations provide community building and valuable hours of service, establishing a sense of responsibility for the wellbeing of the community. The fiscal value of community volunteer hours is the baseline benefit of park-based social capital.

Park activities and volunteer organizations provide community building and valuable hours of service, establishing a sense of responsibility for the wellbeing of the community.

Fiscal Value

A number of case studies point towards the community cohesion value of park volunteers. In Philadelphia in 2007, total contributions of \$8.6 million were made—\$4.28 million in donations and \$4.32 million worth of volunteer hours.² In Virginia Beach in 2010, donations and over 185,000 volunteer hours yielded a value of \$3.95 million.¹⁵ Using national volunteer data and the national Independent Sector value of volunteer work—\$23.07/hour—the **total value of volunteer hours is calculated to be \$390 million.**¹⁶ In addition, conservancy organizations in the 100 largest cities gave over \$166 million in donations to parks in 2014.¹ **The total estimated value of community cohesion in parks is \$557 million.**

Creating Collective Efficacy

More difficult to quantify, though, are the wider impacts of community building, including a sense of responsibility and support. The term “collective efficacy” applies when neighbors feel engaged in the community, trust each other, and are willing to “intervene for the common good when trouble arises”. In Chicago, the Project on Human Development found that: “In neighborhoods where collective efficacy was strong, rates of violence were low, regardless of sociodemographic composition and the amount of disorder observed. Collective efficacy also appears to deter disorder: Where it was strong, observed levels of physical and social disorder were low.”¹⁷

If parks and organizations can effectively harness the talent of the neighborhood and create events inclusive of all residents, the wider community benefits.

Social Trust

In addition to the fiscal and community impacts of social capital, a sense of collective efficacy is a major contributor to country-wide economic growth:

“Growth rises nearly at 1 percentage point on average for each 15 percentage point increase in trust.”¹⁸

HOW? Collectivity efficacy can lead to “concrete community improvements such as fewer homi-cides and other violent crime; fewer property crimes, including graffiti; reduced juvenile delinquency; higher educational achievement; lower rates of asthma and teen pregnancy; and better response to the community’s needs by central governments because they see a united front.”¹¹

While the relationship between parks and national social trust is several abstractions apart, the ties between developing community trust and wider economic health are there. Social trust in the economic sense is defined as trust in other businesses, customers, and regulatory agencies to fairly abide by market rules. Without this trust, individuals are more hesitant to open businesses or engage in transactions. Micro-areas with a sense of community and trust—which can be significantly built by parks—add up to a more trusting overall business climate.

Trust and Growth¹⁸

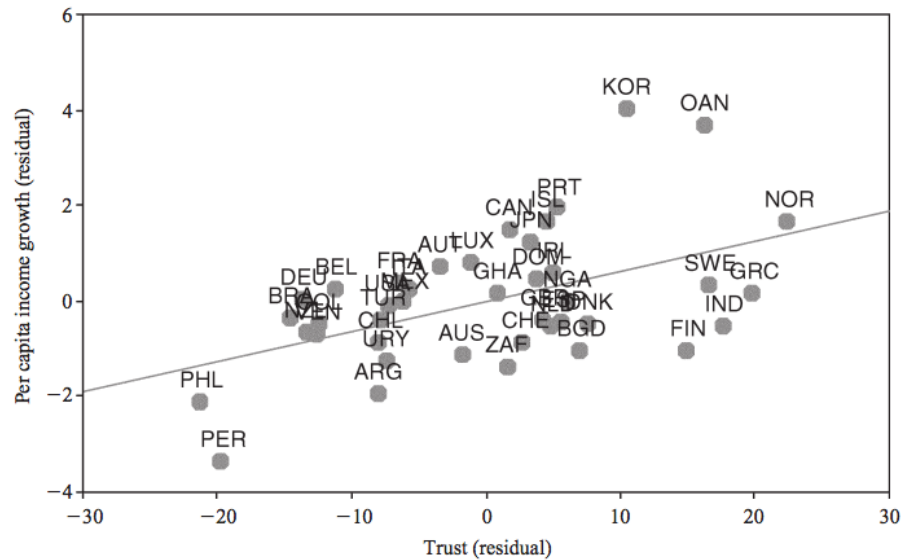


Fig. 1 Trust and Growth (partial plot)

community improvements

fewer property crimes

higher educational achievement

lower rates of asthma

Park Access & Connectivity

Park Access

These benefits highlight why park access is so important. In low-income, high-crime neighborhoods, people have the most to gain from living in close proximity to parks, having active parks volunteer organizations, and receiving adequate park funding. Too often, parks in these neighborhoods are neglected and become the opposite of an urban oasis.

If parks improvements only occur in wealthier neighborhoods, benefits are less substantial and accruing where they are not truly needed.

Access to public goods is a big component of their effectiveness; a lack thereof indicates poor planning and wasted money.

Connectivity

Even if a city has a great deal of parks, they are of no use to the citizens who cannot access them. Access to public goods is a big component of their effectiveness, and a lack thereof may indicate poor planning and wasted money. Maximizing park access is necessary to realize the full economic, social, and health benefits of park usage.

For economic development, access to communications technology is vital: in particular, high speed internet. An unconnected population is one with less opportunities for enrichment and advancement. Cities committed to having a connected citizenry often are also committed to making their public spaces accessible.



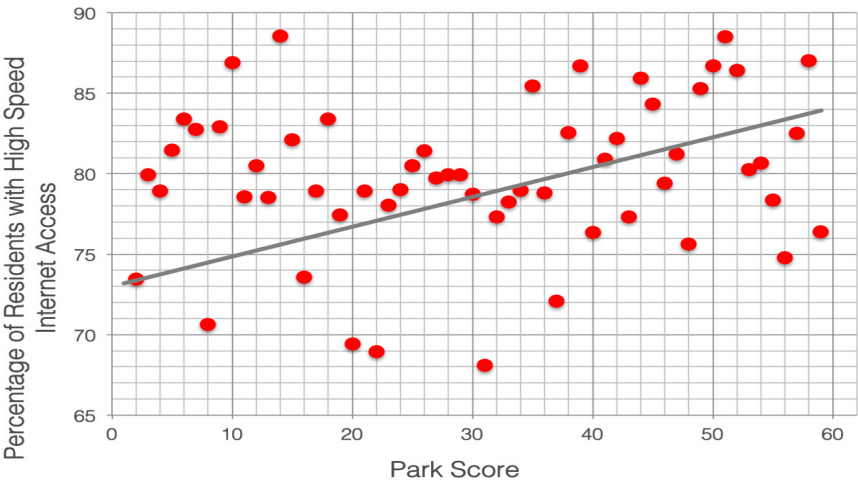


Importance of Connectivity

Specifically, **there is a correlation of 0.66 between the percentage of citizens connected to high speed internet and the Park Score of a city, a ranking produced by the Trust for Public Land.** This indicates a moderately positive relationship between these facets of connectivity in cities. The Park Score ranking is based on park acreage, facilities & investment, and access—percentage of citizens within walking distance of a park.

As aforementioned, exposure to new ideas, people, cultures, and experiences, all contribute to an entrepreneurial climate. Connection to the internet represents ease of economic activity, as well as social and cultural connections. The internet furthers the development of human capital and has reduced the barriers to entry for new businesses and ideas. Access to parks and general Park Score represents access to social and cultural elements of a city, as well as the strength of the community.

Table: Relationship Between Internet Connectivity and Access to Parks in Major Cities



$X = \text{Park Score, Trust for Public Land}^{21}$
 $Y = \text{Internet Access, US Census Bureau}^{19}$

The correlation between these two values represents a relationship between access to economic and socio-cultural goods. With this, we can say that cities dedicated to ensuring equal access to one value are more likely to also be concerned with the other, compared to other cities.

The correlation between park and high speed internet access represents a relationship between access to economic and socio-cultural goods.

Total Value of Parks

Adding up the economic values of each individual benefit we have an approximation of the total economic benefit stemming from parks. These estimates are based on averages and historic patterns; comprehensive city-by-city surveys would be necessary to provide a completely accurate value. These calculations, however, can provide a valuable estimate for how much parks are worth.

The total spend in 2015 on parks and recreation from the 100 cities is **\$6.37 billion**, while the benefit is **\$132.7 billion**.

This indicates that every dollar spent on parks and recreation yields \$20.84 worth of economic benefits.

National Economic Value of Parks in Millions ^{1,15}

Category	Public Value	Private Value
Direct Value		
Property Value Increase*		\$102,054.50
Tourism Value		\$494.28
Total Direct Value		\$102,548.78
Indirect Value		
Stormwater Management	\$989.30	
Air Pollution Mitigation	\$258.39	
Mental Health Value		\$2,730.00
Physical Health Value**	\$9,675.90	
Community Cohesion Value	\$557.05	
Direct Use Value	\$15,965.61	
Total Indirect Value		\$30,176.25
Total Value (in millions)		\$132,725.03

* public value at 1% property tax rate

** could be public or private depending on who pays for healthcare



Budgets & Incentives

In total, park agencies in the 100 largest cities spend \$6.37 billion a year on operating and capital costs. Of this, **about 20% of spending goes towards capital spending¹** (investing in new land, parks, and infrastructure). Capital spending is of the most concern, because capital assets in parks and recreation are not treated as such.

Park Statistics for 100 Largest Cities - List in Appendix¹

Category	Average	Median
Total Spending per Resident	\$94.00	\$75.00
Spending Adjusted for Cost of Living	\$91.78	\$82.93
Capital Spending per Resident	\$20.00	\$15.00
Capital Spending Adjusted for Cost of Living	\$19.50	\$13.92
Acres of Parkland	19,524	5,631
Parkland as a % of City Area	19%	9%
Spending Per Acre	\$8,557	\$5,843
Capital Spending Per Acre	\$1,912	\$790
Employees	377	241
Total Capital Spending*	\$16,962,749	\$6,523,651
Total Spending*	\$68,512,241	\$33,556,098

*in thousands

Capital assets like parkland, facilities, and recreation equipment are often treated like sunk costs rather than fixed assets that should be at full productive capacity.

Few other industries operate this way - large amounts of money invested, then performance ignored. Parks are created, and left to simply exist without any thought towards creating improvements. Of course, it makes sense that this happens, for there is no direct financial gain to be had by improving the performance of this existing asset. However, incentives for improvement ought to be established by parks departments, because improving park performance will generate wider economic gains. Yearly capital spending is in the millions, and ought to be even higher given the positive impacts of parks.

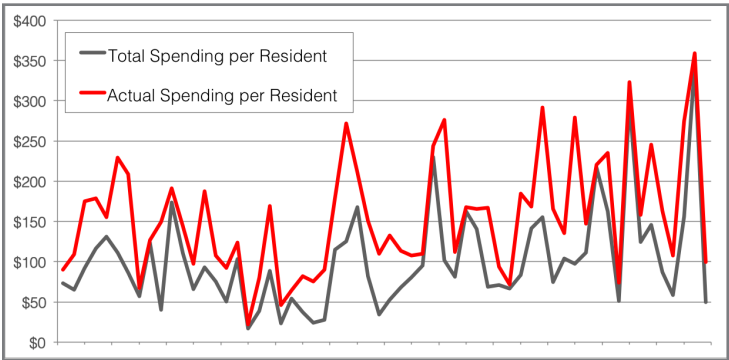
Parks have assets and expenditures, just like businesses



Effectiveness

Parks have demonstrably large budgets, but are they accomplishing their target goals? Consider “equal access to parks” as a goal. Data exists on the spending per resident, but is the spending per resident evenly distributed? This adjustment reflects a possible method of combining data sets to examine park effectiveness. The below chart demonstrates that per resident spending is actually much higher when accessibility is considered.

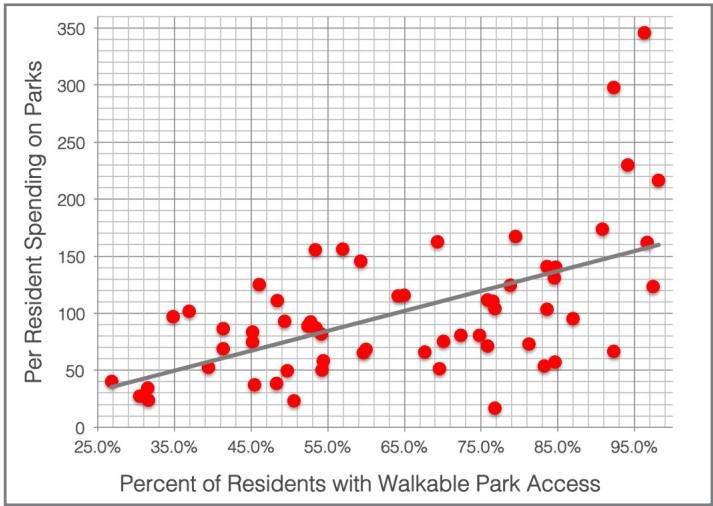
Total vs. Actual Spending per Resident, Based on Park Access¹



Left: In order to determine the actual spending per resident, spending was recalculated including only the percentage of citizens with walkable park access.

Are cities with greater accessibility also more committed to parks? If spending and proximity are to be taken as adequate proxy values, the answer is yes. The correlation of 0.56 indicates a moderately strong relationship, meaning a city that spends more per person is also likely to have greater access to their parks.

Relationship Between Park Access and Per Capita Spending¹



User Valuation



In considering the monetary value of parks, user valuation must also be included. Namely, if it costs money to use the park or its various features, how much would people be willing to pay? Willingness to pay, called “direct use value”, can be looked at as a kind of theoretical income for parks. This paper aims to look at parks from a business analytics framework.

Thus, if parks were a business, how much money would they be making?

The amount residents value parks—the direct use value—is 12x the revenue, meaning a large share of potential revenue has yet to be captured.

Direct Use Value

Surveys of visitor value indicate a rather low value on basic park usage—around \$2—but higher values when specific activities and events are occurring.^{2,15} Parks have billions of visits across the U.S. yearly, so the potential income is quite substantial. This is not advocating for parks to begin charging money, rather simply pointing out how valuable they are to users.

Based on the average valuations from six cities and the visitation and population of the top 100 cities, **their direct use value is \$15.96 billion.** Another metric of park effectiveness is the ratio of direct use value to city spending. Using the median spending values in the U.S., **for each dollar spent on parks, there is \$4.76 of direct use value.**

Revenue Possibility

The National Recreation and Parks Association reports that there is a median of \$4.13 in revenue for each parks visitor, and \$21.21 in revenue per capita.³ There is a \$2.75 direct use value per park visit, however, there is a direct use value of \$259.62 per capita. While a good deal of parks visitors are not city residents, and many residents visit parks multiple times a week, these values show that revenue per parks visitor is much lower than visitor valuation. Therefore, there is room for parks to make much more revenue without deterring visitors. Revenue generation must be approached carefully in order to ensure that access to parks remains equal across all income levels.

Park Metrics

As established, parks are a large source of economic and social value, and have a large amount of money dedicated to them. Despite their importance for communities and visitors, parks are not subject to the same kinds of analysis and expectations as other public goods or businesses. This is illogical—after all, parks have desired business outcomes, “customers”, budgets, and wider impact.

Below are some of the metrics, data, and goals that businesses typically find of interest and how they apply to parks.

Parks can use existing business metrics to better serve their audience.

Audience Composition

- Age, demographics, income, occupation, disabilities, hobbies, interests
- How can more programs and features be added that are tailored to a park’s audience?
- Are visitors to the park residents of the nearby area, or from other places? If community members aren’t using a park, why not?

Customer Satisfaction

- Can be approximated in many ways, including the actions of customers or the actual feedback of customers.
- Average spend (in this case, average time spent).
- Feedback as reported by visitors.
- Frequency of visits:
- New v. Returning Customers.
- Customer Retention.

Sale Revenue

- In this case, the ratio of capital spending to improvement in other metrics relevant to said spending: the number of visitors, visitor satisfaction, average spend.



Park Metrics

More than just the audience and their movements:

How are visitors using the park? What kind of revenue do they generate? How is the park being harnessed as an asset?

Collection of Feedback

- How often is the community consulted on desired improvements? Do people participate in sharing?
- How often do they get what they want? How long does it take?
- What features do people value the most? Does the budget reflect user interest in those features?

How is the park being harnessed as an asset?

Operational Productivity / Outreach Efficacy

- Employee productivity and productivity of park space.
- Are people using all the parks' features?
- Are there unexpected times when no one is there?
- How many more events could be taking place there?
- Has the park effectively looped in artists and those with creative talent in the community to partake in activities?

Recruitment of Strategic Partners

- Health and activity partners to promote public health benefits
- Schools or senior centers or gyms to create park programs
- Arts and cultural organizations to create events or programs.

Technology

Using new technology like GIS mapping tools, which the NRPA provides, can help parks departments understand customer sources. By overlaying GIS data with Census demographics or similar data sets, parks can create highly-targeted marketing. Furthermore, using sensors can help parks gather all kinds of data in a customized fashion.

Initial Advocacy

Developing the kind of metrics described on the proceeding pages takes time, money, and strategic commitment. How can you campaign for more of all these things, and baseline parks needs, most effectively?

The National Recreation and Parks Association (NRPA) has been collecting and reporting on parks data for half a century. NRPA suggests answering the following quiz using nationwide parks data:³

- ✓ ☐ **1. Are you adequately funded?**
This can be answered by comparing your budget and per capita or per acre spending with cities that have similar features.
- ☐ **2. Do you have enough parkland?**
Compare city parkland with similar-density cities and national averages.
- ☐ **3. How much are you making?**
Is your parks department getting income through various forms of park-based revenue?
How much of your spending is self-generated?

The first two questions can help departments advocate for more funding and resources, especially when combined with data about the benefits of parks. Assessing park income, and moving to create more, requires looking toward metrics like customer satisfaction.

Parks departments can take matters into their own hands when it comes to funding new projects and programs. Innovative parks have a major opportunity when it comes to generating independent income. Hosting events and facilities that generate income and tourism is a mutually beneficial way for parks to gain more financial control and funding for innovative projects.



Innovation in Action

In order to increase the utilization of parks and to enable parks to reach of their benefits, we need to raise the bar for innovation, appealing to the needs and wants of more users. These parks systems provide great examples of how we can rethink the traditional park experience.

In **Palo Alto, the Magical Bridge Playground**²⁴ is designed to be inclusive of all children. Its specially-made features are accessible to children in wheelchairs, with physical disabilities, autism, visual or hearing impairment, and much more. By making sure all children can enjoy the Magical Bridge Playground, they have increased their audience and helped under served groups gain park access.



The **Chicago Parks Department has incorporated the work of artists**²⁵—both temporary and permanent installations—to activate spaces and bring in new elements to parks. One installation included painting dead trees and “planting” them along Lake Shore Drive to draw awareness to the urban forest. The Cloud Gate sculpture in Millennium Park is perhaps now the most recognizable sign of Chicago.



The **Manhattan Beach Pumpkin Race**²⁶—made possible by the Parks department—has been held for 25 years, and draws nearly 10,000 attendees. Holding annual events fosters community building, draws tourists, and creates economic value.



Finally, the participatory budgeting movement involves cities leaving the allocation of public funds up to the votes of citizens. Cities including NYC, Chicago, and Cambridge, MA have left public fund allocation up to citizens—it is the easiest way to ensure their wishes are being fulfilled, and online voting increases the overall participation in city processes dramatically. Over \$98 million has been allocated to 440 projects via participatory budgeting and 15% of the budgets fund parks, second only to schools.²²

Conclusion

Parks provide great economic, cultural, environmental, and social value to cities. Despite their importance, parks often do not receive adequate funding to test out innovative strategies and expand operations. America's infrastructure deficit means that parks will have to fight even harder for funding in the future, taking revenue generation into their own hands.

Already, parks generate revenue covering over 1/4 of their costs.³ As discussed, there is a large amount of revenue growth potential within the existing customer segments. Parks may secure their future and expand their impact in a number of ways:



Quantify parks data & establish metrics

Parks should equip themselves with data on the value of parks, national parks metrics, and detailed information about their parks. By doing so, they can better campaign for funding, more effectively target and recruit new customers, and accurately plan development to reflect the priorities of park users.



Focus on revenue generation

To ensure parks can weather economic climates and funding changes, as well as to fund innovation, parks ought to turn to new ways of getting funding. Particularly, programming, events, and sponsorships increase visitation and provide income without compromising the core tenet of equal access to parks.



Be responsive & innovative

Parks must embrace new technology, infrastructure, experiences, and approaches. New technology, including GIS mapping and sensor networks, allows marketing and user analysis to go much further. To remain relevant to the younger mobile generations, parks have to rethink how to attract and retain users.



Approach parks like a business

All these tips point towards a business-like approach to parks management. That is not to suggest that free services should end, but that assets should be actively utilized, making marketing and user-base expansion a priority.

Parks are one of the most underrated public goods. In order to remain useful and impactful as society changes, parks must embrace change.

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100 Cities analyzed by Trust for Public Land

Albuquerque	Glendale	Orlando
Anaheim*	Greensboro	Philadelphia
Anchorage	Henderson	Phoenix
Arlington, Texas	Hialeah	Pittsburgh
Arlington, Virginia	Honolulu	Plano
Atlanta	Houston	Portland
Aurora	Indianapolis	Raleigh
Austin	Irvine	Reno
Bakersfield	Irving	Richmond
Baltimore	Jacksonville	Riverside
Baton Rouge	Jersey City*	Sacramento
Boise	Kansas City	San Antonio
Boston	Laredo	San Diego
Buffalo	Las Vegas	San Francisco
Chandler	Lexington/Fayette	San Jose
Charlotte/Mecklenburg	Lincoln	Santa Ana
Chesapeake*	Long Beach	Scottsdale*
Chicago	Los Angeles	Seattle
Chula Vista	Louisville	St. Louis
Cincinnati	Lubbock*	St. Paul
Cleveland*	Madison	St. Petersburg
Colorado Springs	Memphis*	Stockton
Columbus	Mesa	Tampa
Corpus Christi	Miami*	Toledo
Dallas	Milwaukee	Tucson
Denver	Minneapolis	Tulsa
Detroit	Nashville/Davidson	Virginia Beach
Durham	New Orleans*	Washington, D.C.*
El Paso	New York	Wichita
Fort Wayne	Newark	Winston-Salem
Fort Worth	Norfolk	
Fremont	North Las Vegas	
Fresno	Oakland	
Garland*	Oklahoma City	
Gilbert	Omaha	

* Indicates # was based on prior years' data

Appendix

For total property value generated by parks estimate, the sources of the estimate information are as explained below.

The estimate assumed a square perimeter for both the park and the surrounding homes, and an average street width of 50 feet. Calculations were performed with a rectangular perimeter, and yielded similar results. The numbers shown are using the median figures for lot size and home cost, because parks typically do not have huge mansions around them, instead, have more normal-size homes. Below are the figures using both the median and average estimates. Property tax rates chosen were 0.5 and 1%, because those numbers are solid middle points within the distribution of property tax rates for U.S. states. The figures on home prices are probably too low, because they include homes in rural areas and this estimate is looking at the 100 largest cities. On the other hand, figures for lot size may be too large, because they incorporate more rural and suburban properties. It is unclear if these effects offset each other. The estimate used a valuation rate of 5% and a distance of 500 feet for value increases, which could be a low estimate. These figures are based on the values the Trust for Public Land uses, and prior studies on values. Studies have indicated that the value of parks can extend to 1,500 feet, and parks can have much higher valuation rates depending on park quality. The conservative estimate can account for some of the variation in appreciation rate due to park quality and local factors. A limitation to the effect of this value is that only so many parks may be created, and if they are ubiquitous, the effect will become null. However, the increase in property values can be used to advocate for investment in parks and to justify taxes on homeowners to finance said parks.

Total economic value generated by parks estimates were created using the methodology the TPL used in their economic assessment reports and their data sets. This data was overlaid with regional average data points, such as the cost of tourism in a city or the average rainfall. Most of the estimates were created using more average values than the TPL estimates, because creating a city-by-city estimate for these complex values is unfeasible. Our estimate is intended to be just that—an estimate—rather than a completely accurate value. We extended existing analysis methodologies nation-wide, to get an idea of how valuable parks are. Economic estimates are tricky, because does the mental health value include only healthcare costs, or also the productivity costs and emotional/social costs? These calculations were intended to merely provide an idea of parks' value, not a hard-and-fast guideline.

