

AI for Earth Grantee Profile

Trust for Public Land

Mapping the benefits of city parks

Summary

In recent years, interest has increased in understanding the value of city parks and open spaces, not just as social and recreational areas, but also as sources of economic and health benefits. The Trust for Public Land has long worked with urban communities to create parks and protect public land to everyone's benefit. It developed its ParkScore Index to evaluate the effectiveness of parks in the largest US cities, and recently sought to expand that work to many more communities nationwide. Through a Microsoft AI for Earth grant, the Trust for Public Land gained the powerful, scalable resources of Microsoft Azure cloud computing, enabling its ParkServe site to map this data for the 100 largest metro areas in the US.

Mapping the benefits of parks and forests nationwide

From playgrounds to gardens to relatively wild open spaces, parks have long been part of the urban landscape. These spaces provide venues for recreational and social activities and may be valued for enhancing the aesthetics of the city. But in difficult financial times, they may also be seen as expendable and be neglected, and creating new parks may be deferred.

In the past couple decades, there has been a growing desire to better understand the value and benefits of urban parks and open spaces. The American Planning Association (APA) convened its [City Parks Forum](#) in the early 2000s to create a nationwide conversation about the role and importance of city parks, and various studies by different organizations followed.

Parks and urban open spaces can be vital agents of change to improve economic development, the health and quality of life, and environment of cities.

These studies have found that in addition to recreational, social, and aesthetic benefits, parks and open spaces provide health and economic benefits as well. Reviewing the studies to date in 2010, the [American Trails organization found](#) that open space in urban areas increased economic benefits to surrounding property

owners and municipal governments, and compact walkable developments with nearby green spaces had both higher sale prices and enhanced marketability. Following up on the APA's City Parks Forum, the National Recreational and Park Association (NRPA) conducted a roundtable discussion in 2014 about the role of parks and public spaces in cities, examining park projects in several major metropolitan areas across the US. The [roundtable concluded](#), in part, that parks and urban open spaces could be vital agents of change to improve the economic development, health, quality of life, and environment of cities.

Mapping the benefits of city parks

Throughout this time, the [Trust for Public Land](#) (TPL) has been working with urban communities to create parks and protect land for people. With over 30 offices across the nation, TPL helps communities raise funds, conduct research and planning, acquire and protect land, and design and renovate parks, playgrounds, trails, and gardens. To accomplish its mission, TPL has produced tools such as the [ParkScore](#) Index, which evaluates the effectiveness of park systems in the 100 most populous US cities, rated by acreage, investment, amenities, and access. This index is designed to help local communities improve their park systems and identify where new parks are needed most.

ParkServe reveals what areas of a city are underserved by parks and can identify optimal sites for new parks.

Recently, TPL built upon the concept of ParkScore by launching [ParkServe](#), an interactive platform to track urban park access nationwide. The central concept of ParkServe (and ParkScore) is mapping how many people living in cities have access to a park, playground, or publicly accessible protected area within a 10-minute walk. By mapping the existing parks and population density as well as other demographics, ParkServe also reveals what areas of a city are underserved by parks and can identify optimal sites for new parks. Simply getting to an existing park may be a big challenge. Although close by, there may not be a safe route for residents to access a park by foot or bike. Trust for Public Land is working to solve these issues with ParkServe.

Scaling to nationwide analysis through the cloud

ParkServe is initially focusing on the 100 largest metropolitan areas in the US, including around 3,000 incorporated city boundaries. To be useful for city planners and policy makers, ParkServe needs to incorporate large amounts of census demographic data, sometimes for very large urban areas, and run the data through as many as 20 different complex algorithms. Even to process this data for the 100 metropolitan areas is a large undertaking. TPL's goal is to eventually scale up to nationwide coverage, serving nearly 14,000 municipalities that include over 80 percent of the US population. Such national-level analysis requires much more computing

power and infrastructure than TPL's existing in-house systems and would make it difficult for TPL to perform other mission-critical work. Thanks to a grant from the Microsoft AI for Earth program, TPL has a better way.

With the AI for Earth grant, TPL can take advantage of the power of cloud computing through the Microsoft Azure platform. Microsoft provided access to [Esri ArcGIS Pro](#), the standard commercial geographic information system (GIS) used for this kind of mapping project, housed in a Microsoft Azure [Geo AI Data Science Virtual Machine](#) (Geo-DSVM). The Azure Geo-DSVM was specifically designed in collaboration with Esri to support geospatial analytics capabilities through tight interoperability with ArcGIS Pro.

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The Geo-DSVM provides the scalability and speed to manage data processing for the thousands of urban areas at once, saving weeks or even months of work. TPL can run multiple models at once without slowing overall processes down, and can rerun the analysis with new data more frequently. The results of this analysis can be seen on interactive maps on the ParkServe site, and are also available through an API called Map Services, as well as shareable databases.

Moving forward

Historically, TPL's work has been primarily focused at a project level, but they envision taking many of their analytical approaches and applying them at a national scale—such as with ParkServe. Another project TPL has in development for the national level is the Carbon Mapping Decision Support Tool. Aimed at decision makers and planners at state government agencies, non-profits, and foundations, the tool is intended to help states to design and administer incentive programs for private forest owners to increase carbon sinks. At the simplest level, the tool will use datasets from the US Forest Service [Forest Inventory and Analysis \(FIA\) program](#) to show on a parcel-by-parcel basis the benefits of preserving carbon in the ground through restoring and conserving forests. By displaying different data layers, it could show how the metric tons of carbon storage compare to vehicle miles driven, or how these forests could also provide watershed protection for drinking water supplies. Like ParkServe, the Carbon Mapping Decision Support Tool will be a web-based GIS mapping application using Esri ArcGIS and Azure.

For ParkServe, TPL plans to use the big data and machine learning capabilities of Azure to help it fill in information such as health and demographic data that's not always available. Further statistical analysis can

also help TPL explore trends and impacts around parks and communities, such as how much the parks are being used or how well each park provides health and environmental benefits.

About Trust for Public Land

Founded in 1972, the Trust for Public Land has a mission to create parks and protect land for people, ensuring healthy, livable communities for generations to come. Working from more than 30 offices nationwide, the Trust for Public Land helps communities raise funds, conduct research and planning, acquire and protect land, and design and renovate parks, playgrounds, trails, and gardens. Today, millions of Americans live within a 10-minute walk of a park or natural area the Trust has helped create, and countless more visit every year.

Resources

Websites

[Trust for Public Land](#)—home site

[ParkServe](#)

[Microsoft AI for Earth](#)

[Microsoft environmental sustainability](#)

Publications

Peter Harnik and Ben Welle. *Measuring the Economic Value of a City Park System*.

The Trust for Public Land. 2009.

<https://www.tpl.org/sites/default/files/cloud.tpl.org/pubs/ccpe-econvalueparks-rpt.pdf>