

# Parks – Analysis and Modeling Assumptions

## Introduction and Purpose

The *GO TO 2040* plan, due to be complete in 2010, will make recommendations for policies, strategies, and investments needed for northeastern Illinois to reach its potential. For the plan to be viable, it is critical that the *benefits* and *costs* of these recommendations be understood. This document is part of a series that begins to analyze potential plan recommendations in this context by developing “sample programs” for the implementation of potential plan recommendations.

In this case, a “sample program” for parks was developed to create 12,635 acres of parks in the region’s most “under-parked” communities. The remainder of this document, and the accompanying presentation, describe how this “program” was developed.

Before reviewing the remainder of this document, please read the following notes, which explain its purpose and limitations.

- **Implementation:** This document does not address the responsibility for implementing the “sample program” described here. This is a very important consideration and will be addressed as a next step.
- **Scenario context:** Park development will not be pursued in the absence of other strategies. CMAP recognizes that the benefits of the strategy are magnified when linked with urban design improvements, infrastructure investments, and others. As a later step, park creation will be analyzed along with these other strategies; but for this series of documents, CMAP is attempting to isolate and examine the benefits of individual strategies.
- **Site specificity:** The results of this analysis are not accurate at the parcel level, and further geographic detail beyond what is shown in this document cannot be given.
- **Assumptions:** To perform the analysis of the “sample program” described here, assumptions were made for appropriate locations, unit costs, and others. The purpose of this document is to allow these assumptions to be discussed and questioned, but please note that *some* assumptions must be made for any analysis to be possible.

The purpose of the analysis and modeling exercise is to determine, on a regional scale, where parks would be developed under the “sample program,” how much such a program would cost, how many acres of parks would be created through the program, how the program would affect job and household distribution, and how it would impact key indicators.

## Key Assumptions

Any regional analysis and modeling process involves making generalities and assumptions. These assumptions were based on available literature and/or interviews with regional and national experts. Assumptions were a part of three stages in this analysis:

- Defining parks in the region through the sample program;
- Determining how much these parks will cost to develop and maintain; and
- Determining the impact of creating these parks.

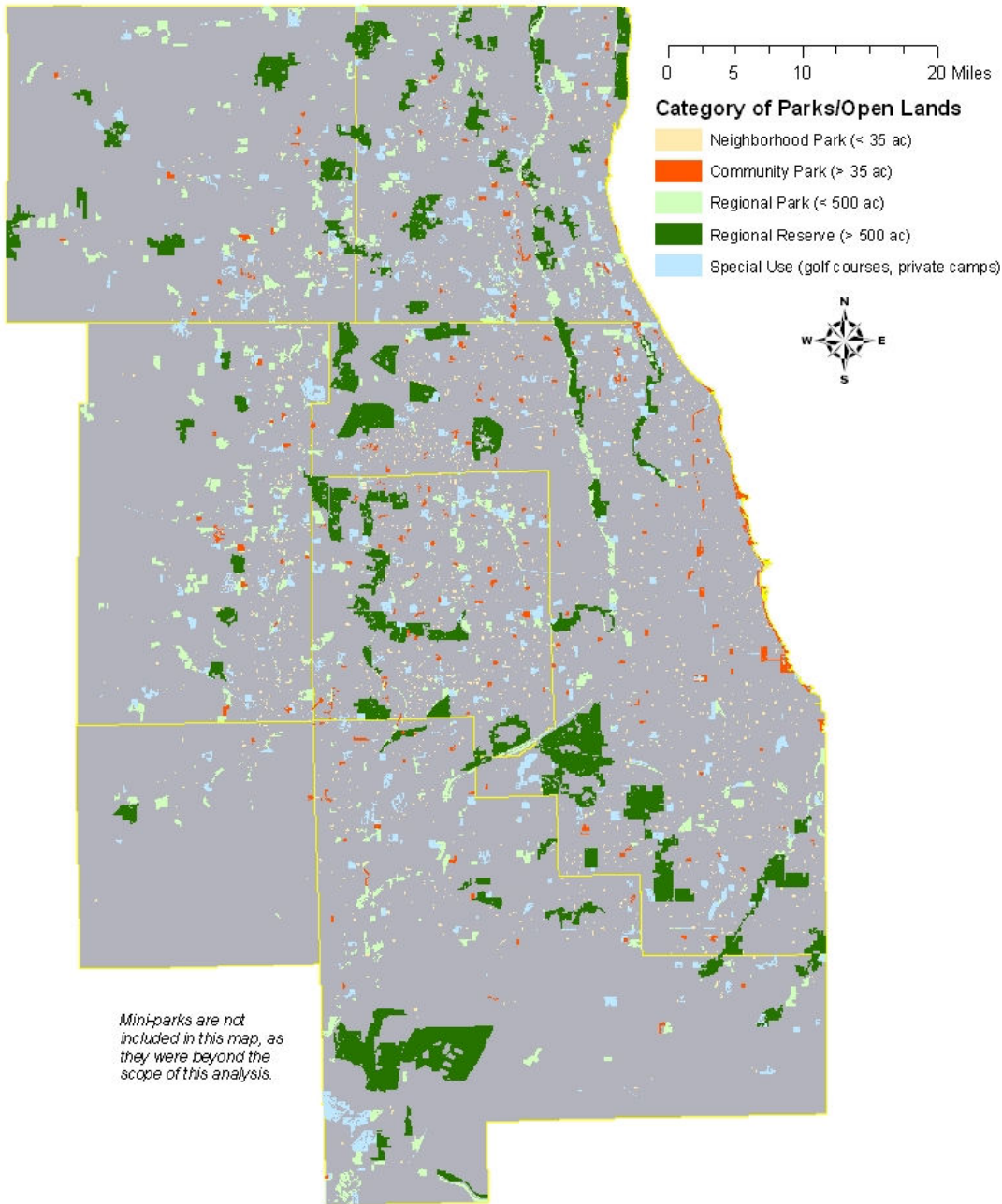
The assumptions within each of these stages of analysis will be fleshed out in greater detail below.

### 1. Defining parks for the sample program to increase access to parkland in the region.

In order to develop a sample program for adding parks across the region, it is necessary to define what constitutes a park. As described in more detail in the preceding strategy report (see

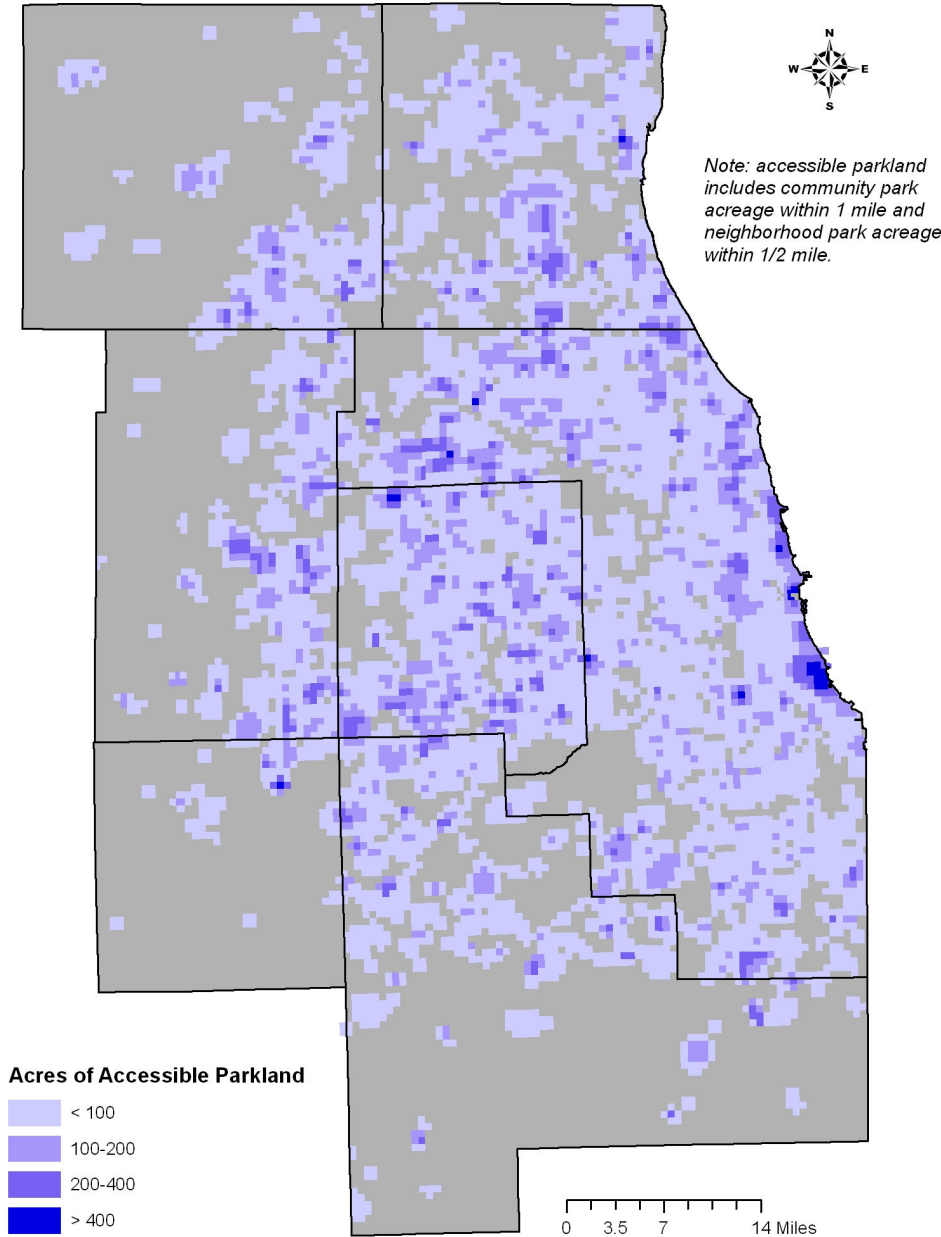
Preservation of Parks and Open Lands at [www.goto2040.org/parks.aspx](http://www.goto2040.org/parks.aspx), the term “park” commonly refers to lands with multiple recreation and/or conservation uses, at a variety of scales. For the purposes of this analysis, however, the focus is on *providing access to community and neighborhood parks*. As described in the strategy report, community and neighborhood parks are those lands which have been identified through CMAP’s (2005) land use inventory as primarily recreation land, rather than conservation land. A different report in this series (see *Open Space Preservation* report at [www.goto2040.org/panel.aspx](http://www.goto2040.org/panel.aspx)) describes a sample program for open space protection and conservation, dealing more with the regional parks and reserves. The neighborhood and community parks are typically smaller and more evenly dispersed, as displayed in Map 1, below.

**Map 1: All Parks and Open Lands in the Region**



Using this map of the existing parks in the region, the next step is to determine which areas are underserved by parks. This was estimated in a multi-step process. The first step is to determine the acreage of parks accessible to each subzone. Using national guidelines<sup>1</sup> of acceptable service areas, a 1/2 mile radius service area was set for all neighborhood parks, and a 1 mile radius service area was set for all community parks. The acreage for each type of park within their respective service areas was calculated for each subzone, and then totaled. In other words, the number of community park acres within a 1 mile radius and the number of neighborhood park acres within a 1/2 mile radius was added together to determine the total number of accessible park acres per subzone. This is displayed on the resultant map, Map 2, below.

**Map 2: Total Accessible Park Acreage by Subzone**



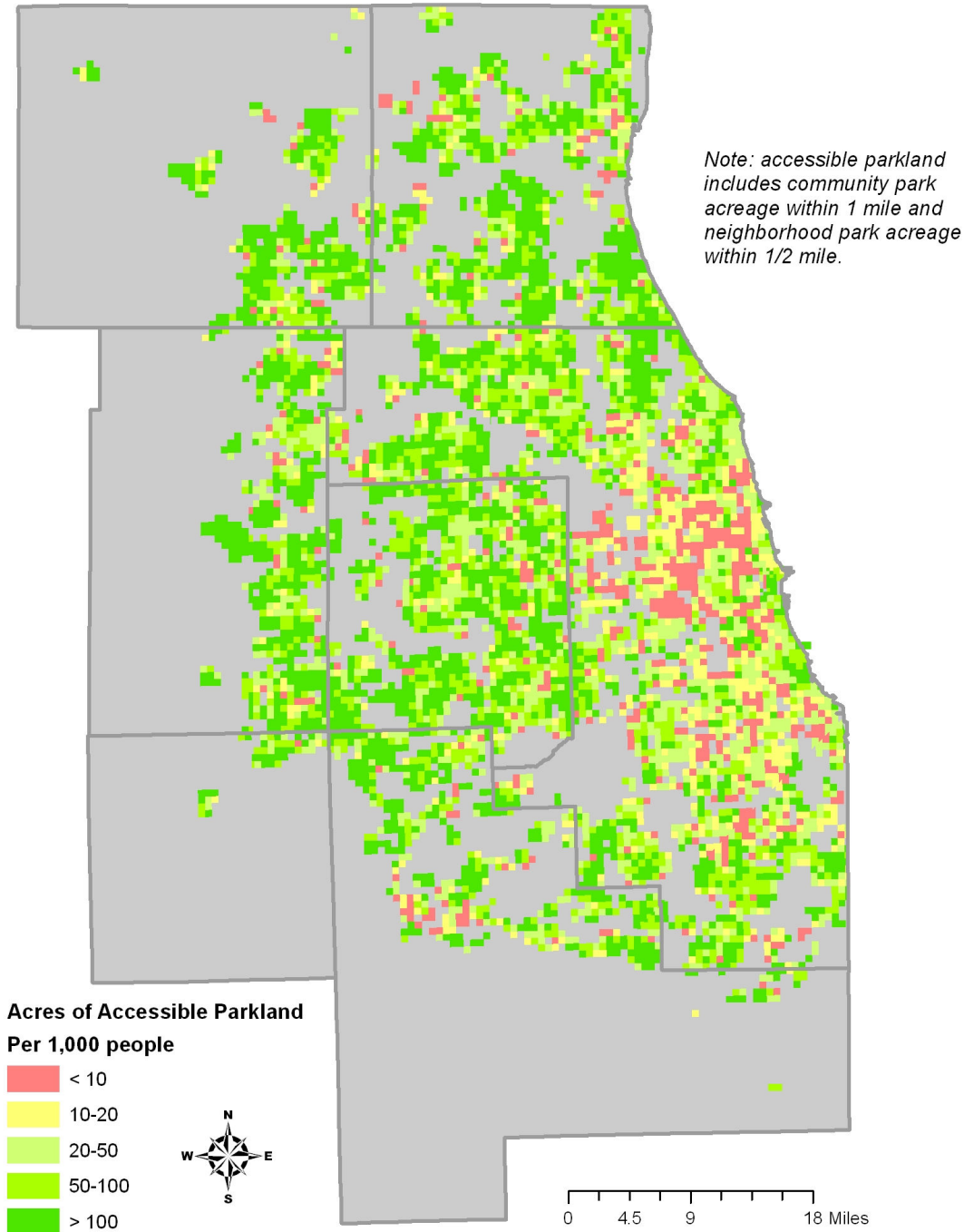
<sup>1</sup> National Recreation and Parks Association; derived from Roger A. Lancaster (Ed) 1983. Recreation, Park, and Open Space Standards and Guidelines Alexandria, VA. National Recreation and Parks Association.

Map 2 shows that parks exist in developed areas across the region. It also reveals that areas with higher densities of population do not necessarily have more parks, with some subzones along the lakeshore as a notable exception.

Before moving on in the process of identifying which subzones are “under-parked,” it is important to screen out those areas where adding parks is most likely unnecessary. Those subzones which would not be targeted by the sample program – subzones that are rural or bordering regional reserves – were omitted. Rural areas are excluded because it is assumed that they will not have the minimum population required to demand significant additions of parks. In addition, subzones with ¼ mile of regional reserves were also excluded. As described earlier, this analysis defines parks as neighborhood or community parks, with primarily recreational uses. The other parks and open lands identified in the strategy paper, regional parks and regional reserves, were not included because they are considered primarily conservation lands. (Special use lands were also excluded because they are primarily golf courses or private camps, usually not providing the same level of access as a park.) However, it is assumed that some of these open lands satisfy adjacent communities’ needs, even if they are regional in scale. Therefore, subzones that are extremely close to a regional reserve were screened out.

The final step in finding the region’s “under-parked” areas is to relate this information to population. According to NRPA standards, anything less than 10 acres of parkland for every 1,000 people constitutes an “under-parked” area<sup>1</sup>. Forecasts of 2010 population for each subzone (screening out ineligible subzones as described above) were evaluated against the total number of accessible park acres for each subzone (calculated by service area as described above). This reveals which subzones are under the threshold (10 acres/1,000 people), and are therefore underserved by parks. This is shown in Map 3, below. The gray areas were not included in the analysis, either because they were omitted for the reasons described above (rural areas and regional reserves), or because they had no population.

**Map 3: Acres of Accessible Parks by Population**



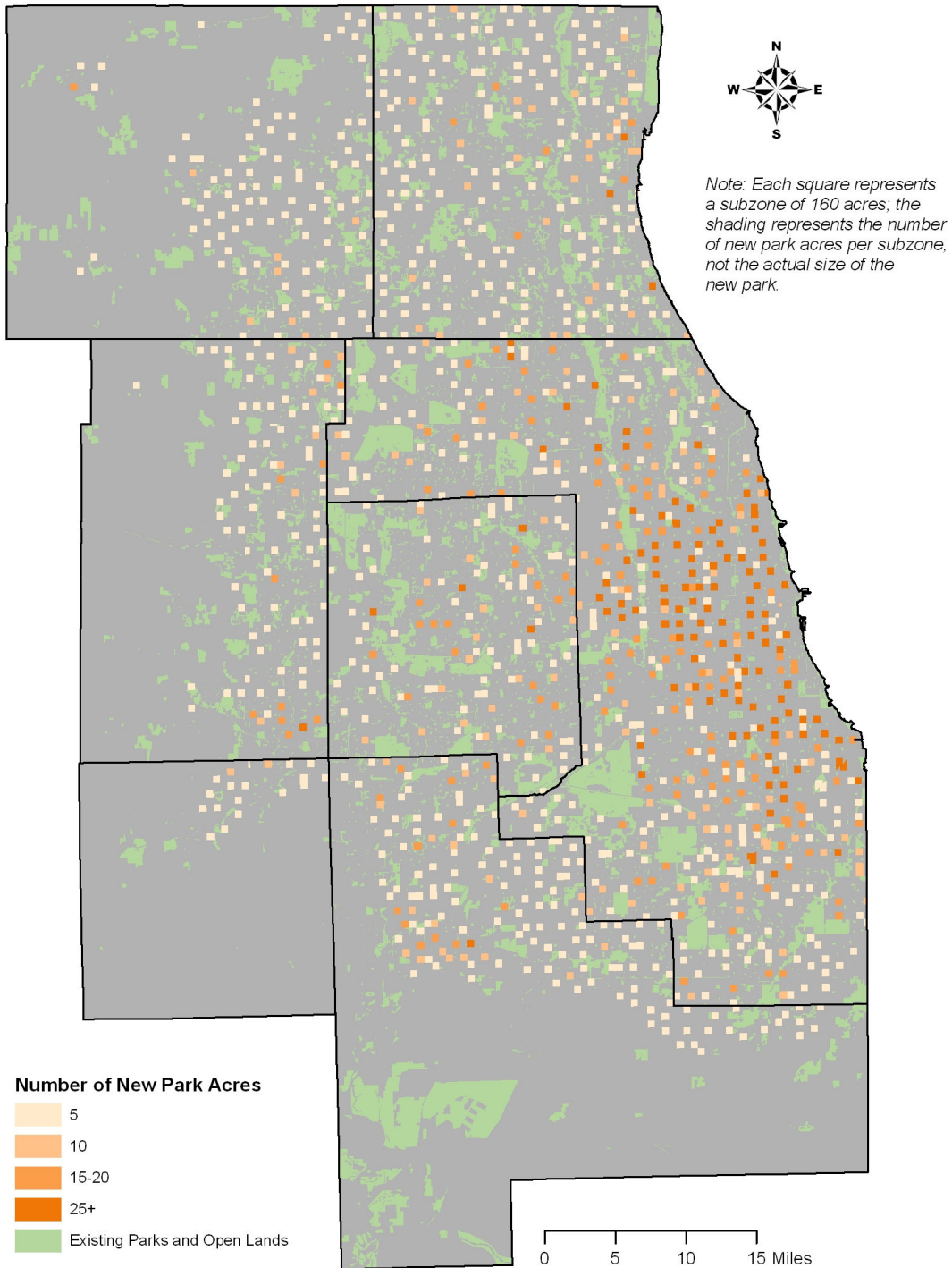
In contrast to Map 2, this map reveals how, although there are many acres of accessible parks in Cook County and along the lakeshore, these parks serve large populations. Therefore, many areas in Cook County, particularly on the northwest side of Chicago and west Cook County, are under the threshold of 10 acres per 1,000 people. This analysis also highlights how some of the faster-growing communities are unable to keep up with park needs as well. “Under-parked” areas can be found in every county in the region, showing that this issue is not unique to any one area.

From this understanding of where parks are needed, a sample program can be developed to add more park acreage and improve access to parks throughout the region. Using the results shown in



Map 3, parks were added – in five acre increments – to the subzones identified as most “under-parked” until the entire region had no eligible subzone under the threshold of 10 acres of parkland per 1,000 people. This was done by adding a five-acre park to the neediest subzone in each county in an iterative process which kept adding until each county was sufficiently “parked.” This resulted in an additional 12,635 acres of parks, shown in Map 4, below.

**Map 4: New Park Acres Added with Sample Program**



The subzones highlighted in Map 4 range in need, in terms of acquisition of park acreage. Map 5, below, shows two of the “neediest” subzones in the region. Both of these areas are very densely populated, resulting in a need for more than 25 acres of parks each. The left map highlights a subzone on the west side of Chicago, a very densely populated neighborhood with no parks within the subzone, and few around it. The map on the right highlights a subzone on the lakeshore, just north of where the lakeshore parks end. Although different demographically, both areas have a combination of high population and little park acreage, resulting in their high need. It is difficult to imagine inserting more than 25 acres of parkland into either location, but adding parks in nearby subzones could potentially serve such dense areas.

**Map 5: Two “Neediest” Subzones According to Sample Program**





## 2. Determination of how much these parks will cost to develop and maintain.

A complete estimate of the cost of adding park acres according to this sample program involves two components – the acquisition cost, and the ongoing operating and maintenance costs. Determining these costs across the region is difficult. Land value varies greatly throughout the region, and since the estimate of park needs is based on population, some of the subzones with the highest need are in the most developed areas. Furthermore, operating and maintenance costs also range greatly depending on the size of the park district and what type of amenities their park system includes. But in order to develop a sample program, acquisition costs and operating and maintenance costs per acre have been estimated for this modeling exercise. Therefore, the results make sense on a regional level, but cannot be accurately scaled down to a local level.

Using assessor data, a Land Value Index<sup>2</sup> was calculated to equalize land values across the region. For the purposes of this strategy, the Land Value Index is comprised of the lower quartile (25th percentile) of land values in every quarter section in the seven counties. The reasoning for using the lower quartile is that agencies acquiring parkland will purchase land strategically, and will seek to acquire land when it is cost-effective to do so. Using this estimate of land value, purchasing the estimated 12,635 acres needed in the sample program would cost about \$4.1 billion.

It should be noted that outright purchase of parkland by public agencies is only one way to acquire this land. As an alternative, new development can be required to include public parks or to contribute funds to establish parks elsewhere. Developer contributions are common ways to increase the supply of park land in growing communities, and this approach shifts costs to the private sector. For this initial analysis, the simple assumption was made that parks would be acquired at public sector expense; CMAP welcomes discussion concerning the different park acquisition methods that could be pursued.

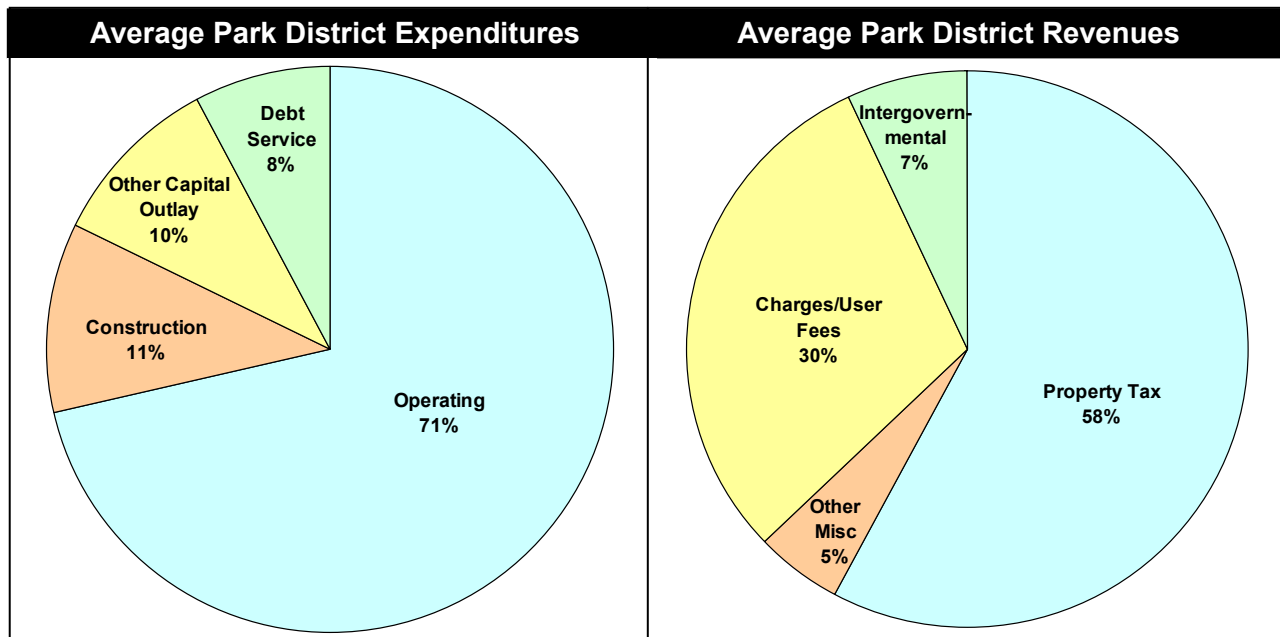
Acquisition is a one-time cost, however, whereas maintenance and operation of the park is an annual cost which must be calculated cumulatively. As described in more detail in the strategy report, parks are beneficial to their neighborhoods only if maintained properly. Operating costs also include the construction of new facilities, such as sports fields, field houses, and lagoons. Units of government which operate parks (park districts, municipalities, townships) typically receive operating revenues through tax receipts and various charges and user fees. Charges and user fees are typically collected to operate certain programs or services specific to particular parks. For example, Chicago Park District receives user fees related to events held at Soldier Field. Many other park districts receive charges and user fees related to golf courses, camps, and other programs. These activities obviously vary greatly from park to park depending on the scale of programs or services offered.

In order to estimate operating and maintenance costs, CMAP analyzed FY 2006 revenues and expenditures from a sample of 31 Chicago metropolitan area park districts<sup>3</sup> in the U.S. Census of Governments. The following two charts display a breakdown of what contributes to revenues and expenditures, averaged across all 31 sample park districts.

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<sup>2</sup> CMAP staff created an index of land value in Northeast Illinois that is based on assessor data from each of the seven counties, obtained between 2006 and 2008. CMAP staff discovered, however, that underassessment was widespread, not only in Cook County, but also in the six other counties. CMAP staff have tried to adjust the land values of every parcel to 33% of market value, which is the assessment level mandated by the state in nearly every county. An Illinois Dept of Revenue report ([www.revenue.state.il.us/Publications/LocalGovernment/PtaxStats/2006AssessmentRatios.pdf](http://www.revenue.state.il.us/Publications/LocalGovernment/PtaxStats/2006AssessmentRatios.pdf)) estimates the ratio of assessed values to sales prices for properties in every township in the state. These ratios were used to increase the land values of all parcels to roughly 33% of market value, thereby making land values more comparable throughout the region. The Land Value Index is an attempt to equalize land values across all 7 counties.





Note: FY 2006 Data from Census of Governments, based on a sample of 31 park districts in region

The amount of land area covered by these 31 sample park districts<sup>3</sup> is roughly 26,000 acres. Dividing the total expenditures (classified by operating, construction, other capital outlay, and debt service expenditures) by acreage yielded a result of roughly \$30,000 in operating and maintenance expenditures<sup>4</sup> per acre. With the sample program estimating a need for 12,635 new acres of parks, these costs are multiplied out over thirty years to 2040. It is important to note that the operating costs are cumulative, so an acre of parkland added in year one costs \$30,000 of maintenance every year thereafter, with a total cumulative operating cost of \$5.8 billion by 2040. The single-year cost of operating the new parks in 2040 is approximately \$379 million. Approximately 30% of these operating costs (\$1.8 billion) could be funded through user fees.

The total cost of the sample program (operating costs and acquisition costs) would be approximately \$10 billion (less user fees). This is outlined in the table, below.

Estimation of Park Sample Program Cost (30-year total)		
Measure	Source/Calculation	Amount
Total acres to be acquired	CMAP analysis (see above)	12,635
Total acquisition cost	Total land value <sup>2</sup> of all acquired acres	\$4,097,946,014
Estimated operating and maintenance cost per acre <sup>4</sup>	CMAP review of park districts' budgets <sup>3</sup>	\$30,000
Total cumulative operating cost	Total acres times estimated operating cost per acre	\$5,875,275,000
<b>Total cost of sample program</b>		<b>\$9,973,221,014</b>

<sup>3</sup> While park districts were the only units of government chosen for this analysis, it should be noted that many municipalities and townships also acquire and operate parks. Park districts alone were used because it is reasonably straightforward to collect data on acreage for each park district, which allows for a useful comparison of revenues and expenditures per acre.

<sup>4</sup> "Operating and maintenance costs" include the following expenditure categories: operating (71%), construction (11%) other capital outlay (10%), and debt service (8%).

### 3. Determination of the impacts of creating and maintaining these parks.

A review of literature and interviews with local and national experts informed the strategy report's assessment of the impacts<sup>5</sup> of creating parks. The main measurable impacts of creating access to parks are:

- Increase in land value;
- Public health benefits; and
- Environmental benefits.

It is widely accepted that creating parks has these benefits, and the strategy paper identified current research focused on quantifying them. This research pointed to an increase in property values in areas near a park, although relatively small in size compared to other factors (e.g., proximity to transit). Access to parks also showed public health gains – evidence of increases in the number of people who are physically active, and preferences for walking as transportation. Although difficult to quantify, research has shown psychological benefits associated with access to green space and parks, especially in highly urban environments. Parks also have clear environmental benefits, as they provide permeable surfaces and tree cover in urbanized areas. Finally, parks can positively affect community character, although these impacts cannot be quantitatively measured. Details about these impacts can be found in the strategy report (see *Environmental, Quality of Life, and Economic Benefits* sections [www.goto2040.org/parks.aspx](http://www.goto2040.org/parks.aspx).)

It is intended that these impacts will be measured and modeled. However, the initial task for this paper is to define a reasonable “program” for increasing park acreage across the region. The next step for many strategies is to determine the impact of the “program” on the distribution of population and jobs. However, it is assumed that this strategy will not affect population and job distribution across the region; parks will neither increase nor decrease development activity nearby.

#### Next Steps

With the stated assumptions, the parks sample program will cost \$6.84 billion if fee-simple acquisition is used, and will result in 12,635 new acres of parks in targeted areas of the region. However, this analysis is not complete, and there are several additional components which need to be considered:

- Several indicators need to be modeled and measured, such as how the sample program impacts local budgets, public health, and the natural environment.
- This analysis has not yet considered implementation, including who would be responsible, and whether the sample program is something that would replace or supplement current park creation efforts. Also, the appropriate split of fee-simple acquisition, easement, and developer contributions must be discussed and determined.
- The analysis was conducted with current population figures, and reflects only the new parks needed to serve the region today. Once a forecast is prepared for the distribution of population and jobs in 2040, the analysis will need to be updated.

These are all extremely important aspects of this strategy which need to be carefully explored and understood in the next steps of analysis.

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<sup>5</sup> As previously mentioned, the strategy paper also quantifies several environmental benefits of park creation and land conservation, but the focus of this report is access to community and neighborhood parks.