HURON-CLINTON METROPARKS

The economic benefits of Huron-Clinton Metroparks

THE TRUST FOR PUBLIC LAND

The economic benefits of Huron-Clinton Metroparks

Produced by The Trust for Public Land for Huron-Clinton Metroparks
October 2020

THE TRUST FOR PUBLIC LAND

The Trust for Public Land creates parks and protects land for people, ensuring healthy, livable communities for generations to come.

The Trust for Public Land's Conservation Economics team has extensive experience measuring the economic benefits and fiscal impacts of land conservation. Partnering with its award-winning GIS team, it has published over 60 economic analyses across the country, including reports in Alabama, Arizona, California, Colorado, Florida, Georgia, Illinois, Kansas, Kentucky, Maine, Massachusetts, Minnesota, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington, and Wyoming. The Trust for Public Land has advanced this research working with leading academic partners and research institutions, including Colorado State University, Dartmouth College, Georgia Institute of Technology, Michigan State University, University of California-Davis, University of Georgia, Texas A&M, University of Minnesota, University of New Hampshire, University of Vermont, University of Wyoming, and the U.S. Forest Service.

tpl.org/economic-benefits-hcma

Table of contents

Acknowledgments

This Trust for Public Land report was commissioned by the Huron-Clinton Metropolitan Authority.

The Huron-Clinton Metropolitan Authority and The Trust for Public Land express their appreciation for numerous counties, departments, and organizations that provided data and insight for this report. In particular, Livingston, Macomb, Oakland, Wayne, and Washtenaw Counties provided the property data that were critical to the analysis.

The photos used in the report are owned by Huron-Clinton Metroparks.

Executive summary

THE HURON-CLINTON METROPOLITAN AUTHORITY (HEREAFTER REFERRED TO AS "HURON-CLINTON METROPARKS") IS A REGIONAL PARK DISTRICT ENCOMPASSING LIVINGSTON, MACOMB, OAKLAND, WASHTENAW, AND WAYNE COUNTIES. It was created by the citizens of Southeast Michigan in 1940 to steward natural resources and provide recreational and educational opportunities. The Huron-Clinton Metroparks system includes 13 parks that cover over 24,000 acres of protected land and 55 miles of paved trails in addition to many miles of natural surface trails. The system also includes seven regulation golf courses and one par-3 course; 10 full-service interpretive centers, which include two farms; two campgrounds; five beaches; numerous boat launches and marinas; and unique recreational amenities such as the Lake Erie Metropark Wave Pool, Stony Creek Metropark Trippo Water Slide, and Bucks Run cross-country ski trail at Huron Meadows Metropark.

Huron-Clinton Metroparks provides recreational opportunities for residents, improves community health, reduces stormwater runoff, filters pollutants from the air, increases property values, attracts visitors to the community, and boosts economic development. These amenities support local jobs, increase spending at local businesses, decrease health- and management-related costs, and generate local tax revenue. Specifically, the parks and trails, as pictured in Figure 1, produce the following economic benefits (see Table 1):[1]

- The active and passive use of Metroparks results in a $62.3 million benefit to residents who enjoy Metroparks.
    - Each year residents of the five-county region receive a benefit of $32.0 million for the recreational use of these spaces (see Table 10). Popular activities include picnicking, visiting with family, relaxing, playing in playgrounds, hiking, walking, taking photographs, observing wildlife, biking, paddling, and visiting beaches.
    - Independent research shows that park use translates into increased physical activity, resulting in measurable medical care cost savings. The average adult saves $1,250 each year, and the savings are doubled for adults 65 years and older. In total, the combined health savings gained by residents who were physically active in Metroparks were $30.3 million each year (see Table 11).

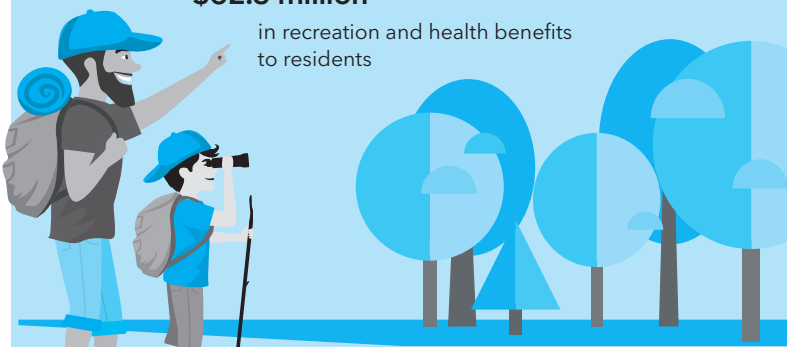
The economic benefits of Huron-Clinton Metroparks

Physical activity in Metroparks reduces health care costs.

Adults save:
$1,250/year
on average

Adults over 64:
$2,500/year

Metroparks provide
$62.3 million
in recreation and health benefits to residents



The region's recreation economy supports
272 sporting-goods stores
Jobs for 3,180 people
$678 million in sales each year

Metroparks generate
$92.4 million annually
in direct visitor spending

Metroparks provide stormwater infiltration valued at
$30.3 million annually
and reduce pollution control costs by
$2.25 million a year

Metroparks raise the value of nearby homes by
$68.0 million
and increase property tax revenues by
$903,000 per year

HURON-CLINTON METROPARKS

Indian Springs Metropark

- Metroparks provide natural goods and services, such as stormwater infiltration and air pollution removal, which are valued at $32.6 million per year.
    - Parks capture precipitation and slow runoff, reducing the volume of water entering the stormwater system. Metroparks provide stormwater infiltration valued at $30.3 million annually (see Table 4).
    - Trees and shrubs in parks remove air pollutants that endanger human health and damage structures. Metroparks provide health benefits and reduce pollution control costs in the five-county region by $2.25 million per year (see Table 5).
- Huron-Clinton Metroparks is critical to the local tourism economy because it provides numerous parks, trails, facilities, and programming that attract visitors. Metroparks generate $92.4 million annually in direct visitor spending (see Table 8).
- Parks and trails in the five-county region increase the value of nearby homes because people enjoy living close to these well-kept amenities and are willing to pay for that proximity. Metroparks raise the value of nearby homes by $68.0 million and increase property tax revenues by $903,000 per year (see Table 2).
- Parks and trails, such as those provided by Huron-Clinton Metroparks as well as other organizations, contribute to the region's high quality of life, which plays an important role in attracting businesses and employees to the region and enhancing the community's recreation economy. Residents of the five-county region spend $313 million annually on sports, recreation, and exercise equipment (see Table 14). In addition, households in the region spend $187 million annually on recreational vehicles (including boats), or $106 on average per household. This spending, along with tourist spending, supports 272 sporting-goods stores that generate $678 million in sales and provide jobs for 3,180 employees.

These benefits are distributed across many sectors of the economy in the five-county region. Each estimate above represents a different type of value, with different time frames, accruing to different beneficiaries such as local businesses, government, and residents. In order to provide a robust and reliable report, this analysis relied on the most conservative methods supported by existing methodology and literature. For example, in any instance where multiple valuation methods were available, The Trust for Public Land utilized the method that produced the conservative, lower bound estimate. This study illustrates that Huron-Clinton Metroparks is a key economic driver that contributes over $90 million in economic benefits annually to the region as a whole (Table 1).

TABLE 1. SUMMARY OF ESTIMATED ECONOMIC BENEFITS PROVIDED BY HURON-CLINTON METROPARKS (2019$)

Benefit category	Total
Enhanced property value	
Total additional property value	$68,000,000
Additional annual property tax	$903,000
Stormwater infiltration	$30,300,000
Air pollution removal	$2,250,000
Tourism	$92,400,000
Recreational use	$32,000,000
Health care cost savings	$30,300,000
Economic development*	
Annual spending on sports, recreation, and exercise equipment by residents	$313,000,000
Annual sales generated by sporting-goods stores	$678,000,000

*The economic development values presented here illustrate the importance of the recreation economy in the five-county region. Not all spending and sales in these categories are exclusively generated by Huron-Clinton Metroparks.

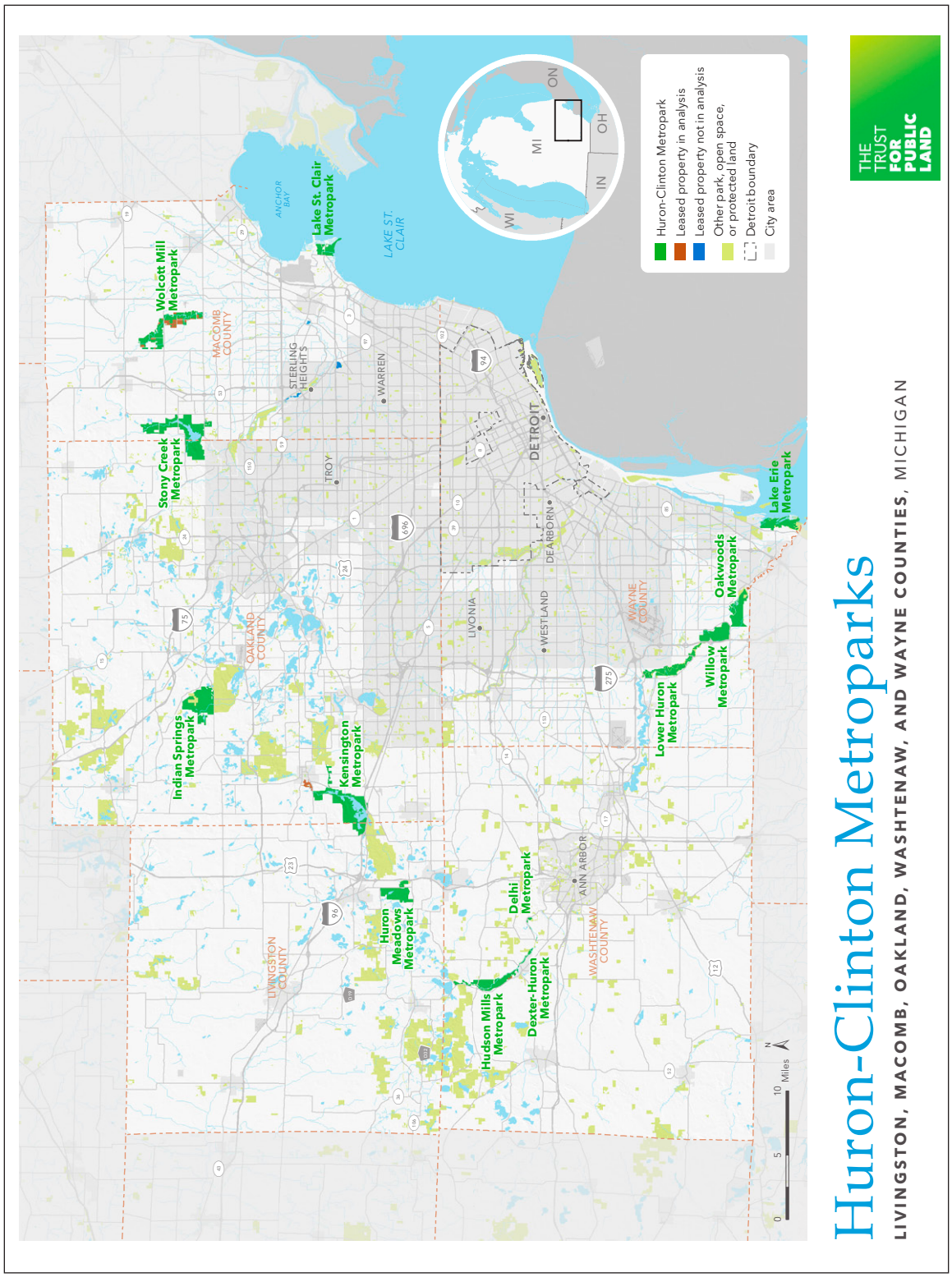


FIGURE 1 Map of the Huron-Clinton Metroparks.[2] Copyright © The Trust for Public Land. The Trust for Public Land and The Trust for Public Land logo are federally registered marks of The Trust for Public Land. Information on this map is provided for purposes of discussion and visualization only.

Parks and the COVID-19 pandemic

THIS REPORT WAS COMPLETED IN THE SUMMER OF 2020, IN THE MIDST OF THE COVID-19 PANDEMIC. At the time, the pandemic had already proved that parks play an important role in enhancing physical and mental health while providing critical spaces for people to more safely connect with nature and each other. It also highlighted the challenges associated with operating parks under such complicated circumstances, especially given the stay-at-home orders and other recommendations that limited movement and upended funding models. Although it is unknown how the pandemic and resulting economic fallout will affect park systems in the short and long term, this analysis sought to provide a baseline understanding of the economic benefits provided by Huron-Clinton Metroparks.

Nationally, the global pandemic has underscored that close-to-home parks are crucial to a community's quality of life. During this crisis, people have turned to their parks like never before—for fresh air, exercise, meditation, a sense of peace. Research shows that parkland is, indeed, a potent force for our well-being: numerous scientific studies show the benefits of nature for both physical and mental health.

As movie theaters, restaurants, bars, and stores closed across the country, parks emerged as the one safe space where people could go. Fortunately, most stay-at-home advisories made exceptions for forays into nature—whether for a walk, a run, or a bike ride. And the vast majority of states and cities kept parks open, even while shutting certain amenities like playgrounds, nature centers, and tennis courts. The result, in many places, was a surge in park visitation. State and city parks officials noted increases from Pennsylvania to Ohio to Texas.

Impacts of COVID-19 were felt at Metroparks almost immediately following the issuance of the first executive orders from Governor Gretchen Whitmer banning large gatherings and closing schools in March 2020. Interpretive centers were closed to the public, and all public and school programming was canceled. To continue engaging the public, staff developed virtual programming and online activities that were advertised via the Metroparks website and social media channels. Restroom facilities and playgrounds were also eventually closed. As the number of positive cases of COVID-19 grew in Michigan, especially in and around Detroit, arrangements were made to enable Metroparks staff to work remotely where possible. Some departments experienced temporary layoffs, and the hiring of seasonal staff was put on hold due to the postponed opening of golf courses and aquatic facilities per the governor's orders.

During this time, Metroparks were often very busy, as visitors took advantage of the many miles of paved and natural surface trails and vast open spaces throughout the system. In April and May of 2020, Metroparks experienced a significant increase in vehicle entries in comparison to

the previous year, at 31.3% and 30.9%, respectively. Some parks saw dramatic increases of over 48% in April 2020 specifically.[3] Vehicular entries do not show the entire picture of visitation, however, as many regional trails connecting into Metroparks also serve as park entrances. For example, a trail counter installed at Lake St. Clair Metropark (in Macomb County) in early May 2020 captured over 25,000 pedestrian or cyclist entries into the park for the month.

In order to ensure that proper social distancing procedures were possible for the number of people visiting, the Metroparks Police Department coordinated with Park Operations to regularly survey parking lots and to close off certain facilities or entire Metroparks when capacity reached 60 percent. In June 2020, as certain restrictions began to be lifted statewide, Metroparks began to open more facilities, including boat rentals and playgrounds, and new signage was developed to encourage social distancing in these and other gathering areas. Metroparks staff anticipates the need to incorporate social distancing practices into the planning of programming, community engagement initiatives, and special events for the indeterminate future.

HURON-CLINTON METROPARKS

Kensington Metropark

At the time of this report's writing, high levels of uncertainty existed around the extent to which the COVID-19 pandemic would affect the economy or the economic benefits provided by Huron-Clinton Metroparks. In the United States, economic activity plummeted and unemployment soared in the wake of the coronavirus. Despite not knowing the scale of these impacts, researchers at The Trust for Public Land had a better understanding of which economic categories were most likely to be affected. For example, natural goods and services such as air pollution removal and stormwater infiltration were not likely to be directly affected by the pandemic or the economy more broadly, but benefits related to the use of the parks were more likely to be affected. That is, recreation, health, tourism, economic development, and property value could see potential short- or long-term impacts.

Recreational use value, as explained in the report, depends on several factors, including the frequency of park use by residents and the types of activities in which they participate. The pandemic has the potential to affect the nature of park visits—by changing who visits, how often they visit, and the ways they engage with the park during their visits. The closure of community attractions such as stores, restaurants, bars, museums, libraries, and other venues may encourage an expanded local interest in parks; however, that increased demand may be met with management actions intended to keep parks safe (e.g., limiting parking spaces to reduce crowding). In addition, park visitors may shift their park activities to ones that require fewer interactions and enable social distancing. Local and state guidance, as well as agency decision making, may also limit the types of activities that are available. For example, Huron-Clinton Metroparks delayed opening its golf courses due to state regulations.

Health care cost savings, also described in the report, depends on several factors, including the number of people who use the parks for physical activity. As explained above, we expect park use to change in an undefined way; however, lower levels of gym and fitness center use may encourage residents to exercise out-of-doors, which could drive park-based physical activity.

Tourism value, or direct visitor spending, will also be affected by the pandemic, which not only has changed park use but also has limited the feasibility and desirability of travel, and the ability of visitors to make discretionary purchases on their trips. Although tourism will be lower for an unknown amount of time, outdoor tourism may rebound faster or account for a larger share of the market as the tourism economy recovers.

Latter in the report, The Trust for Public Land also explores the recreation-based economy and spending by residents on related goods and equipment. Although the pandemic will impact

HURON-CLINTON METROPARKS

Kensington Metropark

consumer spending in unknown ways, The Trust for Public Land also knows anecdotally that certain industries, such as bicycling, are experiencing increased demand that may help counteract dips in spending to some extent. In addition, the value of homes may decrease due to the economic fallout related to the pandemic. In that case, the property value benefit provided by Huron-Clinton Metroparks would also decline proportionally due to macroeconomic conditions.

The following pages outline the economic benefits provided by Huron-Clinton Metroparks. The values derived in the report are based on the most recent data that were available at the time of analysis, which occurred prior to the coronavirus taking hold in the United States. While the changes due to COVID-19 are certain to affect the overall economy and the level of benefits provided by Huron-Clinton Metroparks, The Trust for Public Land believes that this report's results emphasize how significant the park system is to the community and the return that the region's residents gain from investing in these park assets. The pandemic has underscored the importance of having these amenities available in our communities and the power they have to improve our health and well-being, but as this report also demonstrates, they are a key part of the local and regional economy and will be essential as the region works to rebuild its economy.

Introduction

PARKS AND TRAILS, SUCH AS THOSE PROVIDED BY THE HURON-CLINTON METROPOLITAN AUTHORITY (HEREAFTER REFERRED TO AS "HURON-CLINTON METROPARKS"), ARE VITAL COMPONENTS OF HEALTHY, FLOURISHING COMMUNITIES. Parks and trails are public goods that are owned and maintained by federal, state, and local governments, as well as nonprofit organizations, for residents to access.

Well-maintained parks and trails provide tangible and measurable economic benefits to residents and governments. Through economic analysis, it is possible to isolate and quantify many of these benefits and help interested parties gain a fuller understanding of the value of their parks and trails. This report analyzes Huron-Clinton Metroparks and documents a selection of the significant economic benefits that it provides to the community.

Huron-Clinton Metroparks offers many recreational opportunities to the public, including biking, boating, camping, canoeing and kayaking, disc golf, educational programs, fishing, golf, hiking, horseback riding, interpretive centers, mountain biking, swimming, visiting beaches, and more. Metropark amenities are frequently highlighted in the local press, including local television stations such as WXYZ Detroit and FOX 2 News, major publications such as *Crain's Detroit*, and more local publications such as *Curbed Detroit, Livingston Daily, Macomb Daily,* and

HURON-CLINTON METROPARKS

Stony Creek Metropark

HURON-CLINTON METROPARKS

Kensington Metropark

others.[4] By providing access to an array of outdoor amenities and activities, Huron-Clinton Metroparks generates numerous economic benefits within the region.

In addition to preserving natural resources, parks and trails provide economic benefits by enhancing property values, offering recreational opportunities, improving human health, attracting visitors, and providing natural goods and services such as filtering air pollutants and managing stormwater. They also support local jobs, boost spending at local businesses, and generate local tax revenue.

In order to provide robust and grounded evaluations, this analysis relied on the most conservative methods supported by comparable economic valuation studies. In any instance where multiple valuation methods were supported, or where a range of values were available for analysis, The Trust for Public Land selected the method or values producing the lower bound estimate. As such, it is likely that the actual benefits are higher than what The Trust for Public Land estimated in the following pages.

Although this analysis determined many of the economic benefits of Huron-Clinton Metroparks, it did not capture the full value of these high-quality, well-managed spaces for area residents. From quiet places for walking to year-round public programming, the full value of Huron-Clinton Metroparks goes far beyond dollars and cents.

Increasing property value

PARKS AND TRAILS HAVE A POSITIVE IMPACT ON NEARBY RESIDENTIAL PROPERTY VALUES.[5] All other things being equal, people are willing to pay more for a home close to these amenities. Since property tax is based on a home's value, the increased value of homes near these spaces leads to additional property taxes being generated annually. Through economic analysis, it is possible to isolate the impact that parks and trails have on home values. This section estimates the increased property value that can be attributed to Huron-Clinton Metroparks, as well as the additional tax revenue generated on an annual basis.

The property value added by parks and trails is separate from the value that residents gain from the recreational use of these amenities. Property value goes up even if the resident never visits or uses a given park or trail. Rather, property value is affected by two factors: quality of and distance from the park or trail.

Research has found that the quality of parks and trails can affect nearby property values in several ways.[6] Beautiful natural areas with public access, scenic vistas, and bodies of water are markedly valuable. Less attractive or outdated parks and trails may provide only marginal value, and in some cases, they may actually reduce nearby property values. When looking at the impact of individual parks and trails, economic analysis is complicated by the subjective nature of a park's or trail's quality as well as the variation in quality across time. In order to account for such variations and impacts on the premiums generated by individual parks, The Trust for Public Land relies on a methodology that accounts for the impact of a community's entire park and trail system. The park premium that is applied in this analysis of Metroparks and trails isolates the minimum average value added by these spaces collectively, separate from other locational factors that affect a home's value, such as proximity to transportation networks and central business districts. Using this method, The Trust for Public Land applied a park premium that is based on the value of the entire system of parks rather than any one individual park or trail. This makes it possible to generate a reliable, conservative estimate of the total impact of parks and trails on property values based on established rates from comparable studies.

Distance from parks, open space, and trails is the second factor influencing property values. Nationwide research shows that the premium for proximity to these spaces can extend up to 2,000 feet and can also affect market values by as much as 20 percent.[7] The results of a recent review of U.S. studies found that passive parks can boost home sales by 8 to 10 percent, with greater premiums for larger parks.[8] The National Association of Realtors touts the value of parks and trails and has found that the premium for homes near parks can extend three blocks and start at 20 percent, declining as the distance from the park increases.[9] Research in Cincinnati, Ohio, found that home prices are enhanced by proximity to parks. For the average property in

HURON-CLINTON METROPARKS

Wolcott Mill Metropark

the study (valued at $123,000), every 100-meter increase in the distance from the closest park decreased the sale price up to 0.51 percent ($627).[10] In addition, a study of Three Rivers Park in Pittsburgh, Pennsylvania, found that since 2001, home values within the vicinity of riverfront park investment projects had risen 60 percent compared to the 32 percent rise citywide.[11] Trails also increase property values. For example, a study of the Little Miami Scenic Trail in Hamilton County, Ohio, found that access increases property values for homes located within 10,000 feet of one of the trail entrances.[12] A study of subdivisions in Grand Rapids, Michigan, found that building lots bordering permanently preserved forested lands sold at a 19 to 35 percent premium.[13] This body of literature establishes the measurable impact of parks and trails on property values and showcases the range of property value benefits that have been measured locally and across the country.

Using the most conservative method of analysis supported by these and other studies, The Trust for Public Land analyzed the enhanced property value of and increased tax revenue from residences that are in proximity to Metroparks and trails in the five-county region. First, the Trust for Public Land identified all homes within 500 feet of Metroparks using spatial analysis.[14] The Trust for Public Land obtained property value and tax information for all homes

in the region using parcel and tax data from Livingston, Macomb, Oakland, Washtenaw, and Wayne Counties.[15] This information was then combined with the spatial analysis to estimate a 5 percent value premium for residences proximate to Metroparks and trails, as well as the accompanying property tax contributions due to this premium. The application of a 5 percent premium is consistent with The Trust for Public Land's conservative approach to measuring property value in over a dozen studies of other communities across the country.

Table 2 shows the results of this analysis for all Metroparks in the five-county region. In 2018, 5,060 homes in the region were located within 500 feet of these amenities.[16] These park proximate homes had a total market value of $1.36 billion. An additional $68.0 million in residential property value resulted from proximity to Metroparks. Each year, $903,000 in additional property tax revenue is generated by Metroparks.

TABLE 2. INCREASED PROPERTY VALUE DUE TO PROXIMITY TO METROPARKS (2019$)

	Homes within 500 feet of Metroparks
Market value of homes proximate to Metroparks	$1,360,000,000
Property tax of homes proximate to Metroparks	$18,100,000
Increased market value due to Metroparks	$68,000,000
Increased property tax revenue due to Metroparks	$903,000

Infiltrating stormwater

STORMWATER MANAGEMENT IS AN IMPORTANT ISSUE FOR COMMUNITIES IN THE FIVE-COUNTY REGION. Rainwater that flows off roads, sidewalks, and other impervious surfaces can cause flooding, erosion, and declines in water quality by carrying pollutants with it. Reducing stormwater runoff improves drinking water quality, enhances habitat for fish and aquatic life, and lowers water and wastewater treatment costs. Parks provide these benefits by naturally infiltrating stormwater. This section uses economic analysis to determine the value of stormwater infiltration by Metroparks, specifically considering the management costs that are avoided because of these parks and recognizing the active role Huron-Clinton Metroparks plays in the solution to the region's water issues.

In Southeast Michigan, many organizations are concerned about improving water quality. The Southeast Michigan Council of Governments (SEMCOG) plays a large role in coordinating a host of regional issues, including those related to stormwater, water quality, and green infrastructure. For example, SEMCOG facilitates the Southeast Michigan Partners for Clean Water group, which facilitates information sharing, coordinates public education, and leverages resources related to water quality.[17] Understanding the importance of green infrastructure in reducing the amount of stormwater that enters rivers and lakes, SEMCOG has also created a

HURON-CLINTON METROPARKS

Oakwoods Metropark

HURON-CLINTON METROPARKS

Lake St. Clair Metropark (parking lot swale)

regional vision for green infrastructure.[18] In terms of assets, SEMCOG recognizes the role that Huron-Clinton Metroparks plays in providing essential environmental assets.[19] Parks and green infrastructure also help municipal separate storm sewer systems (MS4s) reduce the amount of polluted stormwater that is discharged without treatment into water bodies. Several urban areas are subject to MS4 regulations, which require permits to discharge in communities such as Detroit, Ann Arbor, Flint, and South Lyon-Howell-Brighton.[20] Economists know that this natural stormwater management service provided by parks has value in Southeast Michigan because several communities in the region have stormwater management fees.[21] In addition, SEMCOG has implemented stormwater services that include technical assistance to help ensure that local governments can comply with MS4 and Phase II permit-specific activities as well as training materials for municipal stormwater employees.[22]

Metroparks support stormwater management by capturing precipitation, slowing its runoff, and filtering out pollutants. Large pervious surfaces in parks absorb precipitation, allowing it to infiltrate and recharge groundwater. Meanwhile, vegetation in parks provides a considerable surface area that intercepts and stores rainwater, allowing some to evaporate before it ever reaches the ground. In effect, these green spaces function like storage reservoirs, reduce peak flows of runoff during rain events, and are an important form of green infrastructure, which

naturally filters, infiltrates, harvests, or reuses stormwater. In addition to the passive absorption of precipitation, Huron-Clinton Metroparks recently assessed its stormwater capacity in a stormwater management planning process and is integrating the recommended priorities into larger facility projects and conceptual plans.[23] The priorities include replacing and repairing failing culverts, outfalls, and gravity mains; constructing green infrastructure treatments such as naturalized swales, bioswales, and rain gardens; establishing no-mow zones, native prairie, and native landscaping; and removing pavement.[24]

The purpose of this analysis is to isolate the volume of stormwater retained by Metroparks above and beyond what they would have absorbed if the parks had been developed similarly to the surrounding region. Several factors contribute to this stormwater volume, including the geographic location, which determines the climate region, annual precipitation, hydrologic soil composition, land cover (including surface permeability and directly connected impervious area[25]), and vegetation types. For the purposes of this analysis, the five-county region was broken into three distinct hydrologic subregions based on precipitation data.

The first step of this analysis was to understand the relevant characteristics of parkland. The Trust for Public Land first determined the perviousness of Metroparks within the regions using the 2016 Percent Developed Imperviousness data from the National Land Cover Database (NLCD) that is created by the U.S. Geological Survey.[26] Impervious areas within the parks consisted of roadways and buildings. The 21,400 acres of parks within the study area had 663 acres of impervious surface, meaning the parkland is 89.4 percent permeable and 2.77 percent impermeable (Table 3). The remaining area is under water.[27] The Trust for Public Land also determined a subset of vegetation types that intercept precipitation, including broadleaf deciduous, broadleaf evergreen, shrub, and grass.

TABLE 3. ACREAGE AND PERMEABILITY OF METROPARKS

Acres of parks	Acres	Percent of area
With pervious soil	21,400	89.4%
With impervious surface	663	2.77%
Under water	1,870	7.79%
Total	23,900	100.0%

Second, The Trust for Public Land estimated the amount of pervious surface in the non-Metropark portion of each hydrologic region using the same NLCD impervious surface data. The pervious land consisted largely of residential front and back yards; private natural areas; municipal, state, and federal parks or conserved lands; and golf courses. Within the three regions, the non-parkland area in the region ranges between 60.0 and 89.0 percent permeability, meaning that between 11.0 and 40.0 percent of the precipitation falls on impermeable surfaces. Metroparks are thus more permeable than the surrounding lands.

Third, the University of California, Davis, created stormwater reduction models for Huron-Clinton Metroparks. The models determined annual rainfall on these lands based on precipitation data for the three subregions. These regions receive between 33.2 and 38.7 inches of rain in a typical year.[28] The models then used hourly annual precipitation data to estimate the total amount of runoff that would be generated across the subregions if Huron-Clinton Metroparks didn't exist and the total amount of runoff that occurs in the region with its Metroparks. The difference in runoff, called the runoff reduction due to parks, is the volume of stormwater that is isolated and valued as part of this analysis. That is, the reduction in runoff that is attributable to Metroparks was calculated by comparing the modeled runoff with the runoff that would leave a hypothetical site of the same size but with a land cover that is typical of the surrounding development (i.e., with streets, rooftops, parking lots, etc.). In other words, the analysis does not measure all the water that is absorbed by Metroparks; it only measures the amount of water that is retained by these spaces above what would be absorbed had the land been developed similarly to the non-park area of the region. Without Huron-Clinton Metroparks, the region would experience 355 million cubic feet of runoff in an average rain year. Fortunately, with Huron-Clinton Metroparks the region experiences 79.7 million cubic feet of runoff. That is, Metroparks reduce stormwater runoff by 276 million cubic feet in an average year, or the equivalent of 3,120 Olympic-sized swimming pools (see Table 4).

The final step in determining the economic value of stormwater retention by Huron-Clinton Metroparks was to estimate the cost to manage stormwater using constructed green infrastructure (i.e., rain gardens, bioswales, and permeable pavers). Using local data about the costs of constructing green infrastructure in its parks[29] and information from the Green Values National Stormwater Management Calculator,[30] The Trust for Public Land estimated that the annual cost of capturing one cubic foot of stormwater using green infrastructure is $0.11.[31] This value is based on conservative assumptions and is well within the range of costs found in national studies, which have cited that construction and annual maintenance costs for common stormwater-management infrastructure range from $0.05 to $0.82 per cubic

TABLE 4. ANNUAL STORMWATER COST SAVINGS FROM METROPARKS (2020$)	
Category	**Value**
Runoff without Metroparks	355,000,000 cubic feet
Runoff with Metroparks	79,700,000 cubic feet
Runoff reduction from Metroparks	276,000,000 cubic feet
Value of stormwater management	$0.11 per cubic foot
Total savings from Metroparks	**$30,300,000**

foot of stormwater managed.[32] Applying this cost to the volume of reduced stormwater runoff, The Trust for Public Land estimates that these spaces provide a total annual stormwater value of $30.3 million (Table 4).

The stormwater value provided by Huron-Clinton Metroparks is conservative for several reasons. First, as mentioned above, the value of stormwater management is based on lower bound estimates of the value. That is, The Trust for Public Land chose to use the lowest locally available estimate of stormwater treatment cost specific to Huron-Clinton Metroparks. Second, the analysis measures the stormwater runoff volume that is passively infiltrated by pervious parkland. It does not include intentional stormwater capture, such as that which is occurring on green infrastructure projects that Huron-Clinton Metroparks has implemented. For example, in 2014, a very large stormwater project at Lake St. Clair Metropark involved the reconstruction and rerouting of stormwater in a large parking lot to reduce contaminated runoff into Black Creek and Lake St. Clair.[33] Including intentional capture, or the additional volume of water captured by constructed green infrastructure would increase this value. Third, Huron-Clinton Metroparks as an organization contributes to community efforts related to water quality issues. For example, Huron-Clinton Metroparks collaborates with the Huron River Watershed Council and the Clinton River Watershed Council.[34]

This analysis demonstrates that Huron-Clinton Metroparks makes a significant economic contribution to the community in the form of treatment cost savings. Without parkland provided by Huron-Clinton Metroparks, communities would have to invest in systems to capture and potentially treat stormwater. Thus, Metroparks are providing tremendous value to the region as a whole by providing this natural service.

Reducing air pollution

AIR POLLUTION IS A SIGNIFICANT AND EXPENSIVE PROBLEM THAT INJURES HUMAN HEALTH AND DAMAGES STRUCTURES. Human cardiovascular and respiratory systems are affected, with broad consequences for health care costs and productivity.[35] In addition, acid rain, smog, and ozone increase the need to clean and repair buildings and other infrastructure.[36] The vegetation in Metroparks plays a role in improving air quality, helping nearby areas avoid the costs associated with pollution.[37] This section uses economic analysis to determine the cost savings Huron-Clinton Metroparks provides by reducing the concentration of pollutants in the air.

Air pollution is a significant issue in Southeast Michigan. *State of the Air* is an annual report by the American Lung Association that looks at air quality across the United States. While Washtenaw County's air quality received a D grade for ozone pollution in 2019 based on the number of days of dangerous concentration levels, Macomb, Oakland, and Wayne Counties all received F grades.[38] Michigan's Department of Environment, Great Lakes, and Energy, Air Quality Division, also monitors air pollutants and found that Livingston, Macomb, Oakland, Washtenaw, and Wayne Counties were designated nonattainment areas due to violations of the 2015 standard of 0.07 parts per million, as defined by the U.S. Environmental Protection Agency.[39]

Trees and shrubs have the ability to remove pollutants from the air. Leaves absorb gases such as nitrogen dioxide, sulfur dioxide, carbon monoxide, and ozone. By adhering to plant surfaces, particulate matter (PM), which includes small particles of dust, metals, chemicals, and acids, can also be removed.[40] The positive, pollution-reducing benefits of parks and trails are thus magnified in Southeast Michigan.

The Trust for Public Land estimated the value of air pollution removed by Metroparks trees using a model designed at the Northeast Research Station of the U.S. Forest Service in Syracuse, New York. This program utilizes the U.S. Forest Service's i-Tree Eco model, which is location-specific and incorporates factors such as tree canopy, pollution, weather, and local demographic data.[41] The model measures change in pollutants, including carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. It does not include the value of carbon sequestration and storage; however, it has been extensively demonstrated that vegetation sequesters and stores carbon.[42]

The Trust for Public Land used the National Land Cover Database to determine the amount of tree canopy cover in Metroparks and further classify canopy cover type. Although the five-county region has numerous trees on private property as well as on streets, this study measures only the economic value of trees located in Metroparks. Tree canopy was analyzed

HURON-CLINTON METROPARKS

Hudson Mills Metropark

for each of the five counties, and coverage varies from 35 to 53 percent of the 24,000 acres of Metroparks land considered in this analysis.[43] The i-Tree Eco model processed the tree canopy cover data to estimate hourly changes in annual air pollution removal due to vegetation in parks and along trails.

The model then estimated the value of these changes for each pollutant based on values established by i-Tree researchers. These values are determined primarily from savings in health care costs related to reduced exposure to harmful pollutants, based on the Environmental Protection Agency's Environmental Benefits Mapping and Analysis (BenMap) Program.[44] These values were then adjusted to 2019 values using the producer price index.[45] A total value of $2.25 million in air pollution removal was estimated for the Metroparks annually (Table 5).

TABLE 5. VALUE OF AIR POLLUTION REMOVED BY METROPARKS (2019$)

Pollutant	Pounds removed	Pollutant removal value
Carbon monoxide	8,600	$6,430
Nitrogen dioxide	68,100	$19,900
Ozone	502,000	$737,000
Coarse dust particles	130,000	$458,000
Fine particles	18,000	$1,020,000
Sulfur dioxide	66,000	$5,970
Total	**793,000**	**$2,250,000**

Generating travel and tourism

FROM KENSINGTON METROPARK'S EQUESTRIAN TRAILS, FARM CENTER, AND NATURE CENTER TO THE EIGHT GOLF COURSES IN THE SYSTEM, HURON-CLINTON METROPARKS ATTRACTS VISITORS TO THE REGION.[46] Travelers who visit these amenities spend money on food, travel, and lodging during their stay, bringing new dollars and new tax receipts into the region. Huron-Clinton Metroparks amenities thus supports Michigan's large and growing tourism industry. While visitor spending at the state level grew by 4.0 percent between 2016 and 2017, county-level spending within the region grew between 3.8 percent and 5.8 percent.[47] This growth translates to $12.8 billion in visitor spending in the region, which supports 91,300 direct jobs, an associated $3.71 billion in direct labor income, and $1.37 billion in state and local taxes each year.[48] This section explores how Metroparks contribute to this critical sector of the region's economy.

Beyond Kensington Metropark, Huron-Clinton Metroparks includes Lake St. Clair Metropark, Stony Creek Metropark, Lower Huron Metropark, and nine other parks. Metroparks are used to host a variety of events and outdoor concerts. Examples include four annual fireworks shows, national fishing tournaments, and large marathon events as well as seasonal farm festivals, guided hikes, concerts at Kensington Metropark, and local music at Stony Creek Metropark and Lake St. Clair Metropark. All of these activities attract visitors to the area. Outdoor recreation, such as that provided by Huron-Clinton Metroparks, is recognized as a driver of the economy.

Huron-Clinton Metropark amenities also enhance the visitor experience for people already traveling to the region. Outdoor recreation activities can often extend the length of a stay in the region for visitors who have a varied itinerary, such as those who might paddle along the Huron River after attending a special event or visiting family, which was the driver of their visit. Other visitors may come to the region for the primary purpose of accessing the outdoors, such as those who travel to the region specifically to spend the day at Kensington Metropark. Either way, visitors can enjoy these amenities and will have several expenditures related to their trip that contribute to the local economy. Beyond the vehicle entry fee, they may purchase paddling gear from nearby sporting-goods stores, hire a guide, eat at local restaurants, and buy gas for their vehicle during the trip. Thus, the number of visitors and their spending and activity determine the contribution to the tourism economy.

Huron-Clinton Metroparks directly generates tourism by providing outdoor recreation. In this analysis, The Trust for Public Land considers the economic value of these amenities to the fullest extent possible. First, this analysis begins with an investigation of outdoor tourism in the region, followed by an investigation of the specific contribution of Huron-Clinton Metroparks.

TABLE 6. TOURISM SPENDING ATTRIBUTABLE TO ALL PARKS AND TRAILS IN THE FIVE-COUNTY REGION (2019$)	
Category	**Value**
Total direct visitor spending	$12,800,000,000
Total local and state tourism tax revenue	$1,370,000,000
Percentage of tourists whose primary reason to visit is the outdoors	7.64%
Approximate spending of tourists that is attributable to parks and trails	$977,000,000
Approximate local and state tourism tax that is attributable to parks and trails	$104,000,000

A conservative way to estimate the contribution of parks and trails to the tourism economy involves understanding the visits made by travelers who come primarily to access the outdoors and the associated spending these travelers generate.[49] To calculate the tourism benefit provided by outdoor amenities as a whole, The Trust for Public Land first isolated the number of visitors to the region whose primary purpose for travel was the outdoors and then applied this percentage to total direct tourism expenditures within the region. Based on visitor survey data, The Trust for Public Land determined that approximately 10 percent of overnight visitors and 6 percent of day visitors to Michigan cited the outdoors as the main reason for their trip. Using information on the percentage of overnight and day visitors (40.9 and 59.1 percent, respectively), The Trust for Public Land was then able to calculate a weighted average for the percentage of visitors who come for the purpose of the outdoors: 7.64 percent.[50] Applying this percentage to the total direct tourism spending and taxes generated in the region, The Trust for Public Land estimated that $977 million in spending each year is attributable to the parks and trails that make the outdoors accessible to tourists (Table 6). Spending by these visitors generates $104 million in local and state tax revenues. Furthermore, spending by outdoor visitors ripples through the economy, adds value, and supports additional jobs. Businesses serving tourists must purchase labor and supplies from other businesses within the local economy. These businesses, in turn, increase their purchases and employ more individuals who spend their earnings on local goods and services.

To isolate the impact of Huron-Clinton Metroparks, the impacts of visitors to other national, state, county, and local parks in the region must be removed from this outdoor tourism component.[51] The Trust for Public Land collected the available visitor information for a host of substitute sites that also contribute to the outdoor tourism economy. As part of this research,

The Trust for Public Land investigated major parks in the region, including national, state, and county parks. The Trust for Public Land also considered the economic impact of local parks, such as those owned and maintained by municipalities as well as outdoor providers, such as the Detroit Riverfront Conservancy. The best available data were incorporated into this analysis to isolate the contribution of Huron-Clinton Metroparks.[52]

The Detroit River International Wildlife Refuge (DRIWR) is located along the Detroit River and western shoreline of Lake Erie, in both Wayne and Monroe Counties. Visitation to the refuge includes event participants, hunters, wildlife viewers, photographers, and volunteers. A total of 6,300 visitors visit the refuge annually, a portion of which visit the section of the DRIWR that is within Wayne County. Using information on the proportion of day and overnight visitors to Michigan, as well as data on the spending of day and overnight visitors (an average of $65 per trip and $145 per trip, respectively),[53] The Trust for Public Land estimated that these 2,080 annual visitors spent $216,000.[54]

The state park system also plays a role in attracting overnight and day-use visitors to the region.[55] Michigan's Department of Natural Resources (DNR) provided information about day use and overnight campers at the 15 state park units located in the region. Overall, these units experienced 10.9 million visits in 2017, including 10.8 million day visits and 120,000 overnight visits.[56] The Trust for Public Land estimated that these visitors spent $763 million on their trips.[57]

The Trust for Public Land also collected visitor data related to county parks in the five-county region. Livingston and Macomb Counties do not have park departments, but they manage a small number of parks through their planning departments. Livingston County, which at the time of this report's writing had one park, does not track visitor information but anecdotally reported mostly residential use.[58] Similarly, Macomb County does not track usage of its two parks or the Macomb Orchard Trail. Given the unavailablity of data and the nature of parks in Livingston and Macomb Counties, The Trust for Public Land did not include the impact of these amenities in their estimation of the region's outdoor tourism economy.

Oakland County tabulates overall park system usage as well as visitors' zip codes. Data provided by the county indicates that the system experiences 1.98 million visits in 2018, 25.4 percent of which originates from outside the five-county region.[59] Using statewide tourism data, The Trust

HURON-CLINTON METROPARKS

Stony Creek Metropark

for Public Land then estimated that the 501,000 tourist visitors to Oakland County Parks spent $51.9 million in the region.[60]

Washtenaw County tracks usage for the county's golf course, recreation center, and spray park, as well as events and programs. Data provided by the county indicate that the park system received 48,400 participants in 2018.[61] The Trust for Public Land estimated these visitors spent $153,000 in the region.[62]

Wayne County also provided data on park attendance for 2018, which indicate 560,000 visits annually. Of these visits, the county estimates that approximately 70 to 75 percent live within Wayne County. The Trust for Public Land used this information to estimate that 30 percent of visitors, or 168,000 visits, are from individuals who live outside Wayne County. Unfortunately, data did not exist to isolate visitors from the other four counties in the region. Assuming that

HURON-CLINTON METROPARKS

Kensington Metropark

these visitors are making day trips, The Trust for Public Land estimated that the direct spending by tourist visits to Wayne County parks is $11.6 million annually.

The estimated visitor spending attributable to national, state, and county parks was then subtracted from the overall tourism spending that is due to the outdoors (see Table 7). In addition to these amenities, local parks are part of the tapestry of amenities that make the outdoors accessible to tourists. Unfortunately, no comprehensive information is available on the nonlocal visitors to local parks. As such, their component of spending cannot be removed from the overall outdoor tourism spending. However, based on its work across the country, The Trust for Public Land knows that federal, state, regional, and county park district amenities are the most likely to draw tourist visits.[63]

The Trust for Public Land also considered the economic impact of private outdoor amenities, such as the Detroit Riverwalk Conservancy. The best available data were incorporated into this analysis to isolate the contribution of Metroparks.[64] The Detroit Riverfront Conservancy estimates that 3 million visitors come to the riverwalk each year. Based on a survey of visitors to the riverfront in 2019, The Trust for Public Land assumed that the 276,000 out-of-state visitors all spent the night, while the 156,000 other Michigan residents followed overall tourism patterns.[65] Using the same spending profiles as above, The Trust for Public Land estimated that visitors to the riverfront from outside the five-county region spent $58.6 million annually. This figure was also subtracted from outdoor visitor spending for the region (see Table 7).

TABLE 7. ESTIMATED TOTAL VISITOR SPENDING ATTRIBUTABLE TO OUTDOOR TOURISM NOT PROVIDED BY HURON-CLINTON METROPARKS (2019$)	
Category	**Value**
County park systems	$63,700,000
Michigan State Parks	$763,000,000
Detroit River International Wildlife Refuge	$216,000
Detroit Riverfront	$58,600,000
Total	**$885,000,000**

The Trust for Public Land measured the tourism value provided by Huron-Clinton Metroparks by isolating the visitor spending due to outdoor tourism and removing the spending by visitors to substitute national, state, county, local, and private parks. This approach results in a conservative estimate of the total visitor spending and provides insight into the scale of the tourism benefit provided by Huron-Clinton Metroparks.[66] In total, Huron-Clinton Metroparks supports $92.4 million in tourism spending each year (Table 8). This spending generates an estimated $9.86 million in local and state tax revenue.[67]

TABLE 8. ESTIMATED TOTAL VISITOR SPENDING ATTRIBUTABLE TO OUTDOOR TOURISM FOR HURON-CLINTON METROPARKS (2019$)	
Category	**Value**
Approximate spending of visitors that is attributable to parks and trails	$977,000,000
Approximate local and state tourism tax that is attributable to parks and trails	$104,000,000
Approximate spending of visitors that is attributable to outdoor amenities not provided by Huron-Clinton Metroparks	$885,000,000
Approximate local and state tourism tax that is attributable to outdoor amenities not provided by Huron-Clinton Metroparks	$94,500,000
Approximate spending of visitors that is attributable to Huron-Clinton Metroparks[68]	$92,400,000
Approximate local and state tourism tax that is attributable to Huron-Clinton Metroparks	$9,860,000

Enabling recreational value

IN ADDITION TO BOLSTERING THE TOURISM ECONOMY, THE PARKS AND TRAILS OWNED AND MANAGED BY HURON-CLINTON METROPARKS PROVIDE SUBSTANTIAL ECONOMIC BENEFITS THROUGH THEIR WIDE USE BY LOCAL RESIDENTS. These amenities offer value to residents in the five-county region by providing access to recreational opportunities such as walking, hiking, enjoying nature, observing wildlife and birding, visiting with family, relaxing, playing in playgrounds, picnicking, and photography. This section measures the recreational value that accrues to local residents who use Metroparks. The value from nonresident use is excluded from this analysis since it is accounted for in the tourism section (see page 26).

Economists know that park and trail amenities provide value because people are willing to pay for recreational access to trails, parks, and even private facilities. This value exists even if individuals do not have to pay to access these amenities (e.g., pay an entry fee). Most recreational uses in the Metroparks are available at low or no cost. That is, vehicles entering Metroparks are subject to an annual or daily pass. Thus, the benefit accrues to the user in one of two ways: by providing cost savings to individuals who were willing to pay to recreate but did not have to, or by providing travel cost savings to individuals who do not have to travel to access a substitute site. In this section, The Trust for Public Land estimates the number of recreational users and the recreational value gained by residents.

To calculate the recreational use value to residents of the region, The Trust for Public Land first determined the number of visits to Metroparks. To do this, The Trust for Public Land relied on counter data provided by Huron-Clinton Metroparks for a subset of park activities and on the results of a professionally conducted telephone survey of residents.[69] Respondents provided information about the frequency of their visits to Metroparks only, and detailed information about the types of activities in which they participated. The survey results indicated that 61.8 percent of adults and 68.1 percent of children visit Metroparks annually. These levels of participation are consistent with national trends in recreational use.

To be conservative for the purposes of the recreational use analysis, the self-reported participation data were adjusted to account for participation in multiple activities during a single visit, and for the overreporting of park use by respondents. The Trust for Public Land also adjusted weekly reported participation in park and recreation activities to account for seasonality. The main season of Huron-Clinton Metroparks runs from Memorial Day to Labor Day. As such, participation is not included in this analysis outside that window of time, unless specific information is available about that use during that time.

Information about park use from the survey was supplemented with the most recent count data available from Huron-Clinton Metroparks at the time of the analysis, which closely tracks

HURON-CLINTON METROPARKS

Lower Huron Metropark

participation in a set of activities including interpretive centers, aquatics, golf, boat rental, disc golf, camping, nonmotorized boating, cross-country skiing, sledding, and ice skating. Combining the survey data with this participation data, The Trust for Public Land developed a solid understanding of annual use in the park system. In total, this analysis shows that residents make 5.60 million visits to the park system each year (see Table 10 ➔).[70]

The results indicate that the most popular activities for children were general park use (such as picnicking, visiting with family and friends, relaxing, and visiting playgrounds), followed by walking or hiking and visiting a beach. For adults, walking or hiking was followed by general park use and taking photographs or viewing birds and wildlife. These activities are also in the top five for adults and children combined. See Table 9 ➔ for a listing of the five most popular activities overall.

TABLE 9. TOP FIVE ACTIVITIES IN METROPARKS AS DETERMINED BY SELF-REPORTED PARTICIPATION

Activity	Total visits	Child visits	Adult visits
General park use[71]	1,100,000	320,000	785,000
Walk or hike	1,090,000	211,000	882,000
Take photos or view birds and wildlife	842,000	172,000	670,000
Bike	614,000	124,000	490,000
Visit a beach	525,000	192,000	332,000

HURON-CLINTON METROPARKS

Wolcott Mill Metropark

Each visit a resident makes to Metroparks has value. Once participation was determined, The Trust for Public Land assigned dollar values to each park use by each participant in each activity. The methodology applied by The Trust for Public Land was developed using the framework of the Unit Day Value method, which the U.S. Army Corps of Engineers employs to count park visits by specific activity, assigning each activity a dollar value.[72] The Trust for Public Land determined the value of recreation activities in the region utilizing local market rates or estimates of outdoor recreation value from Oregon State University's Recreation Use Values Database. Oregon State University's database contains values for more than 20 activities and is based on over 420 economic studies that estimated the use value of recreation activities in the United States and Canada from 1958 to 2015.[73] In determining which values to use, The Trust for Public Land's economists applied the values most conservative and relevant to Metroparks in Southeast Michigan.

TABLE 10. THE ANNUAL ECONOMIC VALUE OF RECREATIONAL USE IN METROPARKS (2019$)

	Annual person visits	Average value per visit	Annual value
Total	5,600,000	$5.72	$32,000,000

The average value per visit of $5.72 represents the value to users above and beyond the cost to participate and is a unique calculation for Metropark users across all activities in which they engage (see Table 10).[74] The value was calculated based on the frequency of park use and the types of activities in which visitors participated during the past year. It takes into account the different types of activities available to residents, seasonality of park use, and varying values by park activity. Applying these values to the number of visits to Metroparks that children and adults make, this analysis finds the recreational use value is $32.0 million annually (see Table 10).[75]

To be conservative for the purposes of the recreational use analysis, The Trust for Public Land designed the approach to be conservative in several ways.

- Adjusting the data to account for individuals' participation in multiple activities during a single visit, such as walking, wildlife watching, and visiting a playground.

- Addressing the tendency of individuals to overreport park visitation due to recall bias and to the perception that park visitation is a socially desirable activity.[76]

- Considering fluctuations in usage by season.

- Recognizing the diminishing returns to park use (i.e., not every visit within a given period has the same value to the visitor. In fact, additional uses of a park are less valuable than the first use).

- Taking into account any fees charged to participate in an activity, including vehicle entrance fees. The per-person fee is subtracted from the imputed value and only the "extra" value is assigned. For example, if a round of golf costs an average of $30 at a Metropark and $40 at a private facility, the value of the resident's first round of golf at a Metropark would be $10.

These results are consistent with the results of Metroparks visitation estimates that are based on vehicle counters. This recreation analysis estimates 5.60 million visits are made by residents. Based on the tourism analysis above, The Trust for Public Land estimated that approximately 933,000 park users are visiting from outside the five-county region. Together, and taking into account the 48,700 mobile center patrons served by Metroparks outside park boundaries, this results in 6 percent more visits than is estimated by the vehicle count data,[77] which is within the range we would expect given the nature of vehicle counts at Metroparks.

Providing health care cost savings

ACCESS TO PARKS AND TRAILS, LIKE THOSE PROVIDED BY HURON-CLINTON METROPARKS, CAN HELP COMMUNITIES MEET HEALTH GOALS AND REDUCE MEDICAL COSTS FOR RESIDENTS. The relationship between health, nature, and parks is well documented in the health care literature. This section recognizes the important role that parks and trails, including those owned and maintained by Huron-Clinton Metroparks, play in improving health, discusses relevant literature and data, and measures the health care cost savings to residents that result from their physical activity and exercise in Metroparks.

Green spaces have been proposed as a health determinant because of the various mechanisms through which they have been found to improve health and well-being. Recent research has shown that there is an inverse relationship between greenness and mortality, indicating that increasing green space should be considered as a public health intervention.[78] Parks provide numerous health benefits, from enhancing mental health to improving physical health. One field of study indicates that people who have increased exposure to the outdoors show long-term mental health improvements. Several studies have demonstrated that access to public outdoor spaces can decrease stress, aid in mental fatigue recovery, and reduce levels of depression and anxiety.[79] Recent research has found that visiting parks can improve mental health, which results in health care cost savings of $6 trillion per year.[80] Exposure to natural environments or more green areas provides further benefits. Researchers have found that leisurely walks in natural environments lead to a 12 percent decrease in the stress hormone cortisol and are linked to lower depression and perceived stress.[81] In addition, women living with a higher amount of greenness around their homes had a 12 percent lower rate of death from non-accidental causes compared to women living with the least amount of greenness.[82] Huron-Clinton Metroparks consists of many passive-use parks that improve the mental health of the region's residents.

In addition to mental health benefits, studies have found that physical inactivity and poor diet together are the second-leading cause of death in the United States.[83] Physical exercise can reduce the likelihood of illnesses such as obesity, cardiovascular disease, diabetes, and arthritis, and, consequently, it can also reduce the associated medical costs.[84] There are many ways by which nature has been empirically tied to specific physical and mental health outcomes.[85] Studies of health care economics and policy have established that increased access to public outdoor spaces and more biking and walking infrastructure encourages people to exercise, reducing overall health care expenditures.[86] Investment in public open space encourages behavioral changes that not only reduce chronic diseases and health care costs but also improve quality of life.[87]

HURON-CLINTON METROPARKS

Huron Meadows Metropark

The Robert Wood Johnson Foundation recently ranked the health of Michigan counties, taking into consideration length of life, quality of life, health behavior (including physical inactivity and access to exercise opportunities), clinical care, social and economic factors, and the physical environment. The results show that Macomb and Wayne County residents are more physically inactive than the average resident of Michigan. That is, according to the Robert Wood Johnson Foundation, 24 percent of Macomb County's population and 25 percent of Wayne County's population were physically inactive in 2019, compared to 22 percent of the state's residents.

Having access to exercise opportunities, including but not limited to parks, is critical to a community's level of physical activity. Some county-level data show that the majority of residents have access to these opportunities. That is, 94 percent of Macomb and Wayne County residents have access to exercise opportunities.[88] However, access is not uniform within these counties, and some residents have more access to high-quality parks than others. For example, The Trust for Public Land's Parkserve® database indicates that 20 percent of Detroit residents do not have access to parks within a 10-minute walk.[89] In these instances, residents would likely need to utilize public transit or a personal vehicle to access a park. Regionwide, the transit systems are focused in the more urban areas and do not serve all households, which means that some households cannot access the area's largest parks located in less developed areas.[90] Because access is a critical piece of the connection between parkland and physical activity, local and regional agencies such as SEMCOG and Huron-Clinton Metroparks are working to address park accessibility issues.

HURON-CLINTON METROPARKS

Kensington Metropark

Physical inactivity and obesity are challenging health problems that have significant impacts on the resident population. In 2019, between 24 and 34 percent of county resident adults were obese.[91] In fact, Michigan has the nation's 18th highest-rate of obesity, which can be quite costly.[92] While a person of healthy weight incurs annual health care costs around $3,700, moderately obese and severely obese patients average $4,700 and $7,000 in health care costs each year, respectively.[93]

In this analysis, The Trust for Public Land measured the collective cost savings realized on an annual basis by residents who use the Huron-Clinton Metroparks system exclusively to exercise at a frequency, duration, and intensity that result in health care cost savings.[94] The Centers for Disease Control and Prevention (CDC) recognizes that physical activity helps improve overall health and reduces the risk for chronic diseases. As such, the CDC promotes physical activity guidelines, defining sufficient activity as at least 150 minutes of moderate-intensity activity per week or at least 75 minutes of vigorous-intensity activity per week, along with muscle-strengthening activities at least two days per week.[95]

Having access to places for walking can help individuals meet recommendations for regular physical activity.[96] Parks are some of the most commonly reported convenient places for improved physical and mental health, especially if the space is well maintained, safe, and accessible.[97] From a public health perspective, parks provide low-cost, high-yield wellness opportunities.[98]

Based on the CDC's guidelines for physical activity, The Trust for Public Land used the results of the professionally conducted telephone survey (see page 32) to determine how many adults were using Metroparks at a frequency and intensity that would result in health care cost savings. The Trust for Public Land conservatively defines vigorous- and moderate-intensity physical activity according to the guidelines developed by the CDC[99] and assumed the lowest level of intensity possible for each activity. That is, if the respondent reported bicycling, The Trust for Public Land assumed he or she did so at a leisurely pace on level terrain, which qualifies as a moderate activity, rather than at a brisk pace or on steep uphill terrain, which qualifies as a vigorous activity. The Trust for Public Land limited vigorous-intensity activity to running or jogging. Moderate-intensity activities included walking, hiking, and biking. The health analysis does not include sedentary or low-heart-rate activities, such as picnicking, wildlife watching, or fishing.

In addition, individuals must utilize Metroparks exclusively to an extent that is sufficient to meet the CDC's physical activity guidelines. This analysis does not include individuals who use municipal or state parks and trails or private facilities in conjunction with Huron-Clinton Metroparks facilities to meet the CDC's physical activity thresholds. This analysis finds that 16,600 adult residents improve their health to a degree that meets the CDC's physical activity guidelines by using Metroparks.

Based on previous work in health care economics, The Trust for Public Land assigned a value of $1,250 as the annual medical cost savings for adults under 65 years old who exercise regularly. The Trust for Public Land chose this value based on a careful review of health care economics literature that focuses on the cost difference between physically active and inactive persons. The cost savings were based on the National Medical Expenditures Survey, which has been widely cited in similar studies.[100] The Trust for Public Land adjusted the medical care cost savings for inflation and converted the value to 2019 dollars.[101] The Trust for Public Land doubled the health care cost savings for persons over the age of 65 because seniors typically incur two or more times the medical care costs of younger adults.[102] This doubling of health care cost savings is conservative. For example, one study found that average health care expenses for adults over 65 were over three times those of working-age people.[103]

In 2019, the combined health savings gained by residents who were physically active in Metroparks were $30.3 million (Table 11).

TABLE 11. ESTIMATED HEALTH BENEFITS OF RESIDENTS' PHYSICAL ACTIVITY IN METROPARKS (2019$)

Adults 18–64	**Value**
Number of adults (18–64) physically active in Metroparks	9,030
Average annual medical care cost difference between active and inactive persons 18–64 years old	$1,250
Subtotal of health care benefits (18–64)	$11,300,000
Adults 65+	
Number of adults 65+ physically active in Metroparks	7,600
Average annual medical care cost difference between active and inactive persons over 65 years old	$2,500
Subtotal of health care benefits (65+)	$19,000,000
Total adults physically active in Metroparks	**16,600**
Total annual value of health benefits from Metroparks	**$30,300,000**

This estimate allows interested parties to begin to gain a sense of the health value provided by Huron-Clinton Metroparks. Additional value is likely provided by:

- Physical health benefits that result from active park use by adults that partially contributes to medical care cost savings. That is, while many residents use parks to engage in physical activity within Metroparks exclusively at a frequency, duration, and intensity that meet CDC guidelines, others use these amenities in combination with other public or private amenities to improve their physical health.
- Mental health benefits that adults receive from using these spaces.
- Health care cost savings that result when children use these resources to an extent that makes them healthier—physically and mentally.

Bolstering economic development

HURON-CLINTON METROPARKS CONTRIBUTES TO ECONOMIC DEVELOPMENT IN THE REGION. Metropark amenities enhance quality of life and offer many leisure opportunities that are important generators of economic activity—attracting talent, employers, and investment to the region. This section explores how these amenities enhance quality of life, boost the recreation economy, and support local businesses. It includes in-depth statistics on participation in recreation and annual household spending on sports and recreation equipment, indices of market and spending potential, and a comparison of these results for the region with the national average.

Quality of life

Quality of life plays a critical role in the region's economic development. Employees in today's economy consider more than salary when choosing where to work. For example, focus groups conducted by Carnegie Mellon University have found that young creative workers, particularly those in high-technology fields, consider lifestyle factors such as environmental and recreational quality more heavily than the job itself when choosing where to live.[104] Additional research on local economic development has focused on quality of life and concerns about the natural, social, and cultural environment as well as on lifestyle affordability. This research has looked at a broader range of quality-of-life considerations, from transportation and housing to health care, labor, and the environment. Parks contribute to local economic development by making communities more attractive to new residents and also providing low-cost opportunities for recreation and health that increase the quality of life for residents.[105]

This region has received accolades for its high quality of life and livability. For example, Ann Arbor's outdoor assets, including walking and biking trails, are some of the top reasons for living in the city, according to Livability.[106] According to *U.S. News and World Report*, Michigan ranked as the 37th best state in 2018 and 29th for natural environment.[107]

The importance of the region's quality of life for economic development is acknowledged by the region's community and economic development organizations as well as its business community. For example, the Economic Development Strategy for Southeast Michigan includes strategies to increase awareness of the region's quality of life as a way to market the region to local, regional, statewide, national, and international audiences.[108] Although employment opportunities are seen as the strongest magnet for new residents, providing educational opportunities and quality of life will be essential as the region works to sustain economic growth and bolster its labor supply over the next few decades.[109]

Over 60 percent of Michigan residents participate in outdoor recreation each year, and many visitors come from outside the state to access the outdoor amenities. Therefore, the outdoor recreation industry is a solid driver of the state's economy. Michigan residents are more likely to kayak and camp than the average American. As a result of the outdoor amenities the state boasts, outdoor recreation generates $26.6 billion in consumer spending annually, which supports 232,000 direct jobs with $7.5 billion in wages and salaries and $2.1 billion in state and local tax revenue. That means that more than twice as many direct jobs in Michigan depend on outdoor recreation (232,000) as on the aerospace industry (105,000).[110] Outdoor recreation also accounts for 2.0 percent of the state's gross domestic product (GDP), which means that 2.0 percent of the economy is tied to the outdoor recreation industry, adding $9.7 billion to the state's economy and ranking the state 13th in the nation. This sector supports 2.8 percent (nearly 127,000) of outdoor recreation jobs.[111] Recognizing the importance of outdoor recreation in the state, Michigan established an Outdoor Recreation Advisory Council in 2018, created an Office of Outdoor Recreation Industry in the spring in 2019, and joined the Confluence Accords in the October 2019, joining several other states to promote the outdoor industry and the culture that supports it.[112]

HURON-CLINTON METROPARKS

Stony Creek Metropark

TABLE 12. HOUSEHOLD INCOME AND BUDGET EXPENDITURES, 2018 (2019$)				
County	**Median household income**	**Average household income**	**Average amount spent on household budget expenditures**	**Market potential index, total household budget**
Livingston County	$80,700	$100,000	$84,200	117
Macomb County	$59,400	$76,700	$65,600	91
Oakland County	$76,500	$106,000	$89,500	124
Washtenaw County	$67,200	$95,900	$81,900	113
Wayne County	$46,600	$66,500	$57,500	80
Five-county region	$59,000	$83,600	$71,500	99

Boosting the recreation economy

Huron-Clinton Metroparks amenities also enable recreation activities that generate economic benefits by supporting related businesses, including those that sell recreation equipment. This dynamic is recognized by local outdoor retailers such as REI. According to Jenny Phillips, Ann Arbor store manager, "Overall, I'd say we're seeing a lift in park and trail interest locally. People are starting to understand the mental benefits of getting out into parks. At REI, we recognize the importance of our nonprofit partners, including Huron Clinton Metroparks and others, in creating an environment to recreate in. We host member activation events out of our stores to encourage customers to learn more about public lands, park access, and stewardship. REI has also supported HCMA through our grant program. For example, last year REI supported the Shelden Trails redevelopment at Stony Creek Metropark, a project to develop the Shelden Trail system and create a premier multiuse natural surface trail system in Southeast Michigan."[113]

In order to understand the recreation-related economic activity that occurs in the five-county region, The Trust for Public Land utilized information from the Esri Business Analyst tool. The tool helps users to examine the local economy, consumer behavior, participation in leisure activities, and business activity for a defined geography.[114]

Esri Business Analyst compiles estimates of expenditures and calculates a spending potential index (SPI) that represents the amount spent for products and services relative to the national average. In 2018, households in the five-county region spent an average of $71,500 (2019$) on household budget expenditures, including items like food, housing, transportation, health care, and education. This is 99 percent of the national average for household budget expenditures; however, the market potential index ranges from 80 to 124, indicating that the potential for household budget expenditures ranges from 80 percent of the national average to 24 percent more than the national average. Table 12 shows the average amount spent on household budget expenditures and the market potential index by county. Also included in Table 12 are median and average household incomes, which suggest that some relatively high incomes are

TABLE 13. ESTIMATED PARTICIPATION IN OUTDOOR RECREATION, SPENDING, AND MARKET POTENTIAL IN THE FIVE-COUNTY REGION (2019)		
Activity	**Percent of households participating**	**Market potential index (MPI)**
Walking for exercise	24.5	100
Swimming	16.2	100
Jogging or running	12.4	96
Freshwater fishing	11.7	101
Hiking	11.6	94
Road biking	9.7	100
Canoeing/kayaking	7.1	104
Power boating	4.7	100
Mountain biking	4.1	97
Horseback riding	2.2	94

drawing up the averages in each county. In addition, as one would expect, the market potential is highest in the counties with the biggest difference between average household income and average budget expenditures.

Participation in recreation

While the recreational use survey discussed earlier in this report looked at recreational use among Metropark users, Esri Business Analyst allows for the examination of outdoor recreation activities across the entire population (e.g., municipal parks and private facilities). According to this tool, participation in recreation activities is prevalent among residents of the five-county region.[115] The top outdoor activity was walking for exercise—24.5 percent of households did so in the last 12 months (Table 13). Other popular activities, with over 10 percent of residents participating, included swimming (16.2 percent), jogging or running (12.4 percent), freshwater fishing (11.7 percent), and hiking (11.6 percent)—all recreation activities provided by Huron-Clinton Metroparks. Esri Business Analyst also calculates a market potential index (MPI) that measures the relative likelihood of individuals and households in an area participating in certain activities compared to the U.S. average.[116] Based on the market potential index, The Trust for Public Land knows that households in the five-county region are similar to households nationwide in their participation in many outdoor activities; however, the region's households are slightly more likely than households across the country to fish, canoe, or kayak.

Recreation expenditures and spending potential

Individuals who participate in recreation activities purchase products to enhance their experiences, such as exercise clothing, footwear, bicycles, and fishing tackle. In 2018, 719,000 households, or 20.4 percent of all households, in the five-county region spent money on sports and recreation equipment. Esri's Business Analyst tool compiles estimates of recreation expenditures and calculates a spending potential index (SPI) that represents the amount spent on products and services relative to the national average.[117] As with the MPI, the SPI can be useful for comparing the five-county region to U.S. averages. Residents of the five-county region spend $313 million annually on sports, recreation, and exercise equipment, and households spend an average of $178 (Table 14). This spending—among other recreation equipment expenditures—includes $58.30 on exercise equipment,[118] $54.90 on hunting and fishing equipment, $27.90 on bicycles, and $14.60 on camping equipment. In addition, households in the region spend $187 million annually on recreational vehicles (including boats), or $106 on average per household.[119] From a run in the park to kayaking in the lakes and rivers, the Huron-Clinton Metroparks system enables a wide array of recreation activities and thus supports these recreation expenditures.[120]

TABLE 14. ANNUAL HOUSEHOLD SPENDING ON SPORTS, RECREATION, AND EXERCISE EQUIPMENT IN THE FIVE-COUNTY REGION (2019$)

Spending category	Average amount spent per household	Total spending	Spending potential index
Sports, recreation, and exercise equipment	$178.00	$313,000,000	98
Exercise equipment and gear, game tables	$58.30	$103,000,000	100
Bicycles	$27.90	$49,200,000	95
Camping equipment	$14.60	$25,700,000	100
Hunting and fishing equipment[121]	$54.90	$96,600,000	100
Winter sports equipment	$5.87	$10,300,000	89
Water sports equipment	$6.33	$11,100,000	96
Other sports equipment	$7.84	$13,800,000	101
Rental and repair of sports, recreation, and exercise equipment	$2.23	$3,390,000	94

Local recreation businesses

Metroparks are used for multiple types of activities that generate economic activity and support businesses, including those that sell related equipment and experiences. Several Metroparks provide access to the Huron River, which affects local businesses, such as Skip's Huron River Canoe Livery based in Ann Arbor. As a full-service outfitter, Skip's offers canoe, kayak, and tube rentals and provides all the necessary equipment and transportation to make a fun day on the water safe and easy. Skip's Canoe Livery operates out of Delhi, Dexter-Huron, and Hudson Mills Metroparks and has been operating within the Huron-Clinton Metroparks system for

Biking in Metroparks

Visitors to Metroparks can enjoy biking along park roads, hike-bike trails, and a 14-mile network of natural surface trails that traverse the hills and woods of Stony Creek Metropark. Huron-Clinton Metroparks is currently working with community advocates to create new trails and redevelop the Shelden Trail system to make Stony Creek Metropark a destination within Southeast Michigan. Having high-quality biking amenities supports the local economy, especially when considering the extent to which residents spend on bicycles. In 2018, total household spending on bicycles in the five-county region was $49.2 million or $27.90 per person on average (see Table 14).

HURON-CLINTON METROPARKS

Stony Creek Metropark

HURON-CLINTON METROPARKS

Dexter-Huron Metropark

over 40 years. According to Nathan Pound, an owner of Skip's, "We have established a strong relationship with the Huron-Clinton Metropolitan Authority, or Metroparks, both in our vision to promote and preserve these beautiful parks, but also to provide residents and visitors in this area with a fun outdoor recreational activity that highlights the beautiful Huron River. Our partnership with Metroparks is a great demonstration of a privately owned business working together with a regional park system to improve people's quality of life by encouraging recreational activity and thus improving mental and physical wellness, provide environmental education, and promote preservation of our lands and waterways, and also to provide a form of entertainment that results in economic growth and opportunity for the communities in this area through tourism. Skip's and these Metroparks regularly draw visitors from other counties and neighboring states, and even provide an entertainment destination for tourists from other countries. The economic trickle-down to surrounding restaurants, lodging, and other forms of entertainment is significant and makes this area unique to visit and even more desirable to live in."[122]

In addition to this anecdotal evidence of the support Huron-Clinton Metroparks provides for local recreation businesses, Esri's Business Analyst tool contains information for 272 local recreation-related businesses in the five-county region.[123] This includes businesses such as bike retailers; those that sell equipment and apparel for camping, fishing, and running; wholesalers; and many others. In total, these businesses generate $678 million in sales each year and employ 3,180 people. Whether through renting equipment directly to park users, leading outdoor tours, or offering exercise classes at private facilities, many businesses provide recreation-related activities in the region. Not all of these businesses are directly enhanced by Metroparks, but they support the same sort of activities and users as Huron-Clinton Metroparks, and the existence of a private market further demonstrates the value of these types of amenities to residents.

Conclusion

WHILE REAMS OF RESEARCH HAVE BEEN CARRIED OUT ON THE ECONOMICS OF HOUSING, MANUFACTURING, RETAIL, AND EVEN THE ARTS, THERE HAS BEEN UNTIL NOW NO COMPREHENSIVE STUDY ON THE VALUE OF HURON-CLINTON METROPARKS. The Trust for Public Land believes that answering this question—"How much value does a regional park system bring to a region?"—can be profoundly helpful and useful. For the first time, parks can be assigned the kind of numerical underpinning long associated with transportation, trade, housing, and other sectors. Urban analysts, park planners, economic development professionals, and regional decision makers will be able to obtain a major piece of missing information about how the region works and how parks fit into the equation. Health advocates, business leaders, policymakers, and other regional constituencies may uncover the solid, numerical motivation to strategically acquire parkland and may be able to find a new ally in park advocates.

Huron-Clinton Metroparks is central to the character and vitality of Southeast Michigan. With more than 24,000 acres, over 55 miles of trails, and numerous golf courses, interpretive centers, farms, campgrounds, beaches, boat launches, and unique recreational amenities such as the Lake Erie Metropark Wave Pool, Huron-Clinton provides outstanding value to residents and visitors alike. This study illustrates that Huron-Clinton Metroparks is a key economic driver that contributes over $90 million in economic benefits annually to the region as a whole. The benefits studied in this report are just a selection of the many varied and robust economic contributions generated by the Huron-Clinton Metroparks system.

The active and passive use of Metroparks results in a $62.3 million benefit to residents who enjoy Metroparks. This benefit includes the value to residents of the region who receive an annual benefit of $32.0 million for the recreational use of these spaces. In addition, independent research shows that park use translates into increased physical activity, resulting in measurable medical care cost savings. The average adult saves $1,250 each year, and the savings are doubled for adults 65 years and older. In total, the combined health savings gained by residents who were physically active in Metroparks were $30.3 million each year.

Metroparks also provide natural goods and services, which are valued at $32.6 million per year. Specifically, by reducing the amount of stormwater, Metroparks provide a value of $30.3 million each year. By removing air pollutants that cause damage to structures and endanger human health, the trees and shrubs within Metroparks reduce health care costs and lower pollution control costs by $2.25 million per year.

HURON-CLINTON METROPARKS

Kensington Metropark

Local residents value being close to parks and trails and are willing to pay for that proximity. Metroparks increase the value of nearby residential properties by $68.0 million and property tax revenues by $903,000 per year.

Parks and trails also contribute to the tourism economy. By enabling outdoor experiences, Huron-Clinton Metroparks generates $92.4 million in tourism spending each year.

Metroparks contribute to the region's high quality of life, which plays an important role in attracting business and employees to the county and supporting a robust recreation economy. By providing opportunities for recreation, these amenities support $313 million in resident spending on sports, recreation, and exercise equipment annually, or an average of $178 per household. Along with tourist expenditures, this spending helps support 272 sporting goods stores that generate $678 million in sales and provide jobs for 3,180 employees, further demonstrating that parks and trails are significant contributors to the regional economy. This report is the first time that the significant economic benefits of Huron-Clinton Metroparks have been analyzed. The methodology reflects current best practices for economic analysis and finds that Huron-Clinton Metroparks provides extensive economic value, with these investments paying dividends throughout the region.

Endnotes

1 All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may not appear to sum. The values of the economic benefits estimated in this analysis are reported in 2019 dollars (2019$), having been adjusted with the most recent consumer price index (CPI) and producer price index (PPI) data available at the time of analysis.

2 This map displays approximately 24,000 acres of parkland that were included in this report's GIS-based analyses (i.e., enhancing property value, infiltrating stormwater, and reducing air pollution). GIS data for the 13 Metroparks were provided by Huron-Clinton Metroparks on June 24, 2019. This acreage represents 98.5 percent of the total park acreage; the remaining 355 acres are owned by Huron-Clinton Metroparks but leased to local entities for recreational purposes. The addition of these leased lands would modestly increase the values in the report; thus, their omission from the analysis results in an underestimate of the total value provided by Huron-Clinton Metroparks.

3 Huron-Clinton Metroparks does not have vehicle counters at all vehicular entrances, so this does not likely capture all park use.

4 *Crain's Detroit*, "'Saving Our Sanity': Michigan Parks Grapple with Surge in Visitors Seeking Release from Coronavirus Lockdown," April 10, 2020, accessed June 16, 2020, https://www.crainsdetroit.com/recreation/saving-our-sanity-michigan-parks-grapple-surge-visitors-seeking-release-coronavirus; *Curbed Detroit*, "The Best Hiking Trails in Metro Detroit," April 12, 2019, accessed December 3, 2019, https://detroit.curbed.com/maps/metro-detroit-hiking-trails; FOX 2 News, "Lots to Enjoy This Memorial Day Weekend at Michigan's Metroparks, Social Distancing Included," May 22, 2020, accessed June 16, 2020, https://www.fox2detroit.com/news/lots-to-enjoy-this-memorial-day-weekend-at-michigans-metroparks-social-distancing-included; Huron-Clinton Metroparks, "Press Room," accessed June 16, 2020, https://www.metroparks.com/about-us/press-room/; WXYZ Detroit, "Thursday's Top 7: Metro Detroit's Best Parks," July 19, 2018, accessed December 3, 2019, https://www.wxyz.com/news/thursday-s-top-7-metro-detroit-s-best-parks.

5 John L. Crompton and Sarah Nicholls, "Impact on Property Values of Distance to Parks and Open Spaces: An Update of U.S. Studies in the New Millennium," *Journal of Leisure Research* 51, no. 2 (2019): 127-146; Virginia McConnell and Margaret Walls, *The Value of Open Space: Evidence from Studies of Nonmarket Benefits* (Washington, DC: Resources for the Future, 2005); John L. Crompton, "The Impact of Parks on Property Values: Empirical Evidence from the Past Two Decades in the United States," *Managing Leisure* 10, no. 4 (2005): 203–218.

6 Ibid.

7 John L. Crompton, *The Proximate Principle: The Impact of Parks, Open Space and Water Features on Residential Property Values and the Property Tax Base* (Ashburn, VA: National Recreation and Park Association, 2004).

8 John L. Crompton and Sarah Nicholls, "Impact on Property Values of Distance to Parks and Open Spaces: An Update of U.S. Studies in the New Millennium," *Journal of Leisure Research* 51, no. 2 (2019): 127-146.

9 National Association of Realtors, "Parks, Surf Breaks and Walmart: How Do They Affect Home Values," accessed May 26, 2020, https://www.nar.realtor/newsroom/real-estate-story-ideas/parks-surf-breaks-and-walmart-how-do-they-affect-home-values; Brad Broberg, "Everybody Loves a Park: Green Space Is a Premium When Building, Buying, or Selling," National Association of Realtors, *On Common Ground* (2009): 20–25.

10 Rainer vom Hofe, Oana Mihaescu, and Mary Lynne Boorn, "Are Homeowners Willing to Pay More for Access to Parks? Evidence from a Spatial Hedonic Study of the Cincinnati, Ohio, USA Park System," *Journal of Regional Analysis and Policy* 48, no. 3 (2018): 66–82.

11 Pennsylvania Department of Conservation and Natural Resources, *Economic Impact of Local Parks, Recreation and Open Space in Pennsylvania*, 2014, accessed December 17, 2019, http://www.keystonefund.org/wp-content/uploads/sites/5/2014/03/dcnr_009692.pdf.

12 Rainer vom Hofe and Olivier Parent, "Understanding the Impact of Trails on Residential Property Values in the Presence of Spatial Dependence," *The Annals of Regional Science* 51 (2013): 355–375.

13 Paul Thorsnes, "The Value of a Suburban Forest Preserve: Estimates from Sales of Vacant Residential Building Lots," *Land Economics* 78, no. 3 (2002): 426-241.

14 A home consists of a residential structure that is owned and taxed. This analysis includes single-family homes as well as multiple-unit dwellings (e.g., condominiums). Other property types were not considered in this analysis because sufficient data were not available to quantify the benefit. Nonresidential property types are rarely studied in the literature as they are more difficult to statistically analyze—there are more variables that influence value and fewer real estate transactions to compare.

15 If tax information was not available in each county's GIS data, The Trust for Public Land utilized each county's apportionment report to calculate tax amounts, using the most conservative assumptions to do so. Thus, the tax amount calculated in this analysis is an underestimate of the true value.

16 The Trust for Public Land collected and analyzed residential property data for Livingston, Macomb, Oakland, Washtenaw, and Wayne Counties. Full county datasets containing GIS and tax assessment data were available for Livingston, Oakland, and Washtenaw Counties. In Macomb County, county-wide datasets were unavailable and data were individually collected for the five municipalities containing park proximate residential parcels (i.e., Harrison, Macomb, Ray, Shelby, and Washington). In Wayne County, data were collected individually for the seven municipalities containing park proximate residential parcels (i.e., Brownstown, Flat Rock, Gibraltar, Huron, Romulus, Sumpter, and Van Buren). Thus, the number of residential properties analyzed does not include all the residential properties in the five-county area; however, the enhanced property value reflects the full value of Metroparks.

17 Southeast Michigan Council of Governments, *Southeast Michigan Partners for Clean Water Annual Report,* 2019.

18 Green infrastructure is defined in the vision report to include parks, lakes, wetlands, and trees, as well as constructed green roofs, bioswales, and rain gardens.

19 Southeast Michigan Council of Governments, *Green Infrastructure Vision for Southeast Michigan*, 2014.

20 Michigan Department of Environmental Quality, "2000 Census Urbanized Area Maps," accessed April 13, 2020, https://www.michigan.gov/documents/deq/wrd-stormwater-urbanizedareas_374344_7.pdf.

21 City of Ann Arbor, Michigan, "Stormwater Rates and Credits," accessed April 13, 2020, https://www.a2gov.org/departments/systems-planning/planning-areas/water-resources/Pages/Stormwater-Rates-and-Credits.aspx; City of Detroit, Michigan, "Drainage Charge," accessed April 13, 2020, https://detroitmi.gov/departments/water-and-sewerage-department/stormwater-management-and-drainage-charge/drainage-charge; City of Berkley, Michigan, "Utility Bills and Payment," accessed April 13, 2020, http://www.berkleymich.org/departments/public_works/utilitybills.php.

22 Southeast Michigan Council of Governments, "Stormwater," accessed April 7, 2020, https://semcog.org/stormwater.

23 Huron-Clinton Metroparks, *Huron-Clinton Metropolitan Authority Stormwater Management Plan*, 2019.

24 Huron-Clinton Metroparks, *Stormwater Management Plan: Project Recommendations Prioritization*, 2019.

25 The directly connected impervious area is a surface where stormwater conveys directly from an impervious cover to a storm drain or waterway.

26 The model inputs such as park acreage and permeability are based on the most recent available data.

27 This analysis was conducted on approximately 24,000 acres of parkland in the 13 Metroparks that were provided by Huron-Clinton Metroparks on June 24, 2019. This acreage represents 98.5 percent of the total park acreage; the remaining 355 acres are owned by Huron-Clinton Metroparks but leased to local entities for recreational purposes. The addition of these leased lands would modestly increase the values in the report; thus, their omission from the analysis results in an underestimate of the total value provided by Huron-Clinton Metroparks.

28 Precipitation inputs for this model are based on a "typical" rain year determined from many years of actual local precipitation data. The stormwater model uses real precipitation data from the region based on the annual precipitation that is closest to normal with the smallest standard deviation for annual precipitation and for annual air temperature. Precipitation data are from the National Oceanic and Atmospheric Administration's National Centers for Environmental Information. In addition to the rainfall amounts and difference in permeability between parks and the surrounding region, the model considers the hydrologic soil group, vegetation, and proportion of directly connected impervious area.

29 Huron-Clinton Metroparks, *Huron-Clinton Metropolitan Authority Stormwater Management Plan*, 2019.

30 Center for Neighborhood Technology, Green Values National Stormwater Management Calculator, accessed April 13, 2019, https://greenvalues.cnt.org/national/cost_detail.php.

31 This value includes annualized capital costs and maintenance costs, which are based on the cost of building and maintaining bioswales. Bioswales are the most cost effective treatment when building and maintenance costs, and life span are considered.

32 Based on 2005 cost ranges that were adjusted to current dollars using the consumer price index for all goods and all urban consumers. City of Overland Park, Kansas, *Overland Park Site BMP Cost Analysis*, Olsson Associates, 2007; James P. Heaney and Joong G. Lee, *Methods for Optimizing Urban Wet-Weather Control Systems*, U.S. Environmental Protection Agency, 2006; Ada Wossink and Bill Hunt, *The Economics of Structural Stormwater BMPs in North Carolina*, Water Resources Research Institute of the University of North Carolina, 2003; U.S. Environmental Protection Agency, *Preliminary Data Summary of Stormwater Best Management Practices,* 1999; Chesapeake Research Consortium, *The Economics of Stormwater BMPs in the Mid-Atlantic Region,* 1997; James P. Heaney, *Costs of Urban Stormwater Control,* U.S. Environmental Protection Agency, 2002; U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index.

33 Nina Kelly, chief of Planning and Development, Huron-Clinton Metroparks, email message to author, April 8, 2020.

34 Tyler Mitchell, chief of Natural Resources and Regulatory Compliance, Huron-Clinton Metroparks, email message to author, April 9, 2020.

35 Marilena Kampa and Elias Castanas, "Human Health Effects of Air Pollution, Environmental Pollution," *Environmental Pollution* 151 (2007): 362–367; Janet Currie, "Pollution and Infant Health," *Child Development Perspectives* 7 (2013): 237–242.

36 R. N. Butlin, "Effects of Air Pollutants on Buildings and Materials," *Proceedings of the Royal Society of Edinburgh. Section B. Biological Sciences* 97 (1990): 255–272; U.S. Environmental Protection Agency, *The Plain English Guide to the Clean Air Act*, EPA-456/K-07-001, Office of Air Quality Planning and Statistics, 2007; American Lung Association, "Health Effects of Ozone and Particle Pollution," accessed December 3, 2019, http://www.lung.org/ our-initiatives/healthy-air/sota/health-risks/.

37 David J. Nowak, Satoshi Hirabayashi, Allison Bodine, and Robert Hoehn, "Modeled PM2.5 Removal by Trees in Ten U.S. Cities and Associated Health Effects," *Environmental Pollution* 178 (2013): 395–402.

38 American Lung Association, "Report Card: Michigan," *State of the Air 2019*, accessed December 3, 2019, https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/michigan/. Results for Livingston County indicate that there is no monitor collecting data in the county.

39 Michigan Department of Environmental Quality, *Air Quality Annual Report,* 2017.

40 Particulate matter includes fine and coarse particles. Fine particles consist of particulate matter less than 2.5 micrometers in diameter and are so small they can be detected only with an electron microscope. Sources of particulate matter include all types of combustion, including motor vehicles, power plants, and residential wood burning. Coarse dust particles consist of particulate matter between 2.5 and 10 micrometers in diameter and are generated by crushing and grinding operations as well as dust stirred up by cars traveling on roads. U.S. Environmental Protection Agency, "Particle Pollution (PM)," accessed December 3, 2019, http://www.airnow.gov/index.cfm?action=aqibasics.particle.

41 Local demographic data are based on the demographics for each county. David J. Nowak, Satoshi Hirabayashi, Allison Bodine, and Eric Greenfield, "Tree and Forest Effects on Air Quality and Human Health in the United States," *Environmental Pollution* 193 (2014): 119–129.

42 Housen Chu, Jiquan Chen, Johan F. Gottgens, Ankur R. Desai, Zutao Ouyang, and Song S. Qian, "Response and Biophysical Regulation of Carbon Dioxide Fluxes to Climate Variability and Anomaly in Contrasting Ecosystms in Northwestern Ohio, USA," *Agricultural and Forest Meteorology* 220, no. 15 (2016): 50–68.

43 Tree cover is as follows for each county: Livingston (53 percent), Macomb (35 percent), Oakland (49 percent), Washtenaw (51 percent), and Wayne (48 percent).

44 The Trust for Public Land used rural-urban continuum codes that were developed by the Economic Research Service (ERS) to determine if each of the five counties was urban or rural. These codes are used to distinguish metropolitan counties by the population size of their metro area and nonmetropolitan counties by the degree of urbanization and adjacency to a metro area. Based on the most recent codes available (last updated 5/10/2013), all five of the counties are classified as metropolitan counties. This helps determine the value of air pollution removal benefits, along with other factors. Economic Research Service, "Rural-Urban Continuum Codes," accessed December 13, 2019, https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/.

45 U.S. Department of Labor, Bureau of Labor Statistics, Producer Price Index, accessed January 10, 2020, www.bls.gov/ppi/.

46 For the purposes of this analysis, the region is defined as the five-county area serviced by the Huron-Clinton Metropolitan Authority: Livingston, Oakland, Macomb, Washtenaw, and Wayne Counties.

47 County-level visitor spending between 2016 and 2017 grew by 5.8 percent in Livingston County, 4.5 percent in Macomb County, 5.6 percent in Oakland, 4.1 percent in Washtenaw County, and 3.8 percent in Wayne County.

48 Tourism Economics, *Economic Impact of Tourism in Michigan, 2017, Region and County Tables*, September 2018.

49 This approach is conservative because it does not capture the spending by visitors who come for other purposes but extend their stay to enjoy Metroparks.

50 Longwoods International, *Michigan 2016 Visitor Research*.

51 While private amenities also provide access to the outdoors, the challenges of data collection prevent the impact of these private facilities from being included in this study, although we know that these businesses also contribute to the outdoor tourism economy. That said, many of these private businesses leverage the access and opportunities provided by Metroparks.

52 More specifically, this includes data for the Detroit River International Wildlife Refuge, Michigan state parks, and Livingston, Macomb, Oakland, Washtenaw, and Wayne County park systems, as well as the Detroit Riverwalk. Owing to the unavailability of data, we were not able to include data for State Wildlife Areas or State Water Access Sites, nor were we able to include local parks or private amenities other than the Detroit Riverwalk.

53 Longwoods International, "Michigan 2016 Visitor Research," produced for Pure Michigan.

54 Visitation occurs across access points that are spread throughout 30 parcels that make up the refuge's 6,200 acres. Data do not exist to isolate the visitors to the Wayne County portion of the refuge. As such, The Trust for Public Land assumed that the distribution of visitors followed the distribution of acreage, suggesting that 33 percent of visits occur in Wayne County. It is also unknown where these visitors originate from; however, for the purposes of this analysis, The Trust for Public Land assumed that all visitors to this international amenity come from outside the five-county Huron-Clinton Metroparks region and further assumed that the proportion of day and overnight visitors and average spending by day and overnight visitors ($65 and $145, respectively) follows the overall patterns in visitors to Michigan.

55 The Trust for Public Land also attempted to capture the value of nonresident visits to state wildlife areas and state water access sites, but data were not available about visitors to either amenity type.

56 Ron Olson and Jacklin Blodgett, Michigan Department of Natural Resources, email messages to author, July, 30, 2019. Please note: 2017 was the most recent year for which data were available.

57 Data were not available about visitor spending or the percentage of visitors who come from outside the five-county region. The Trust for Public Land used the available data on day and overnight visitors and information on the average per-person expenditures for day and overnight leisure trips to the area ($65 and $145, respectively).

58 In addition to Lutz Park, which is a small park used primarily by residents, Livingston County is expected to open Fillmore County Park in the near future. At the time of this report's writing the park had not been open to the public, nor were visitor statistics available.

59 Specifically, 65.6 percent of visits are by residents of Oakland County, 5.13 percent by residents of Macomb County, 2.87 percent by residents of Wayne County, 0.82 percent by residents of Livingston County, and 0.27 percent by residents of Washtenaw County. Donna Folland, senior planner, Oakland County, email messages to author between July 11, 2019, and September 9, 2019.

60 Statewide tourism data indicate that 59.1 percent of visits to the state are for day trips and 40.9 percent of trips are overnight trips. Average spending is $65 per trip for day visitors and $145 per trip for overnight visitors.

61 This does not include the Boarder-to-Boarder Trail, which is a significant amenity in Washtenaw County. For example, in 2017, the trail received over 234,000 pedestrian trips and 77,700 bicycle trips at the Dexter Fire Station, located near Mill Creek Park and leading to Hudson Mills Metropark. Owing to the trail's deep integration with the Metroparks system ,it is not possible to isolate the portion of this trail use that is due to the county. Hannah Cooley, management analyst, Washtenaw County, email messages to author, July 24, 2019, and July 29, 2019.

62 In the absence of data related to residency, The Trust for Public Land assumed that the breakout of visitors followed that of Oakland County parks. Given the nature of the park system, The Trust for Public Land assumed that all tourism visits are made by nonresident day users.

63 The Parks and Recreation Plan for Southeast Michigan indicates that local parks provide critical community recreation services and are often seen as a reflection of quality of life in a community. They provide both active and passive recreation, as well as organized sports and other programs. The region's cities, villages, and townships manage approximately 1,800 parks covering nearly 40,000 acres, which range in size from small neighborhood pocket parks to significant regional destinations, such as River Bends Park in Shelby Township. Unfortunately, data on park use for this amenity could not be included in the analysis.

64 The Parks and Recreation Plan for Southeast Michigan indicates that private and nonprofit entities own and operate 40,000 acres of recreation facilities in the region, including sites for downhill skiing and snowboarding, university research areas, land conservancy preserves, and more than 180 private clubs and golf courses. Private amenities also provide access to the outdoors, but the challenges of data collection prevent the impact of these private facilities from being included in this study, although we know that these businesses also contribute to the outdoor tourism economy. That said, many of these private businesses leverage the access and opportunities provided by Huron-Clinton Metroparks.

65 The survey indicated that 39.5 percent of visitors were from Detroit, 20.5 percent from Wayne County, 15.6 percent from Oakland County, 10.0 percent from Macomb County, 9.2 percent from out of state, and 5.2 percent from other places in Michigan.

66 The Trust for Public Land's methodology for estimating the visitor spending attributable to the park system has been developed and applied in dozens of economic benefit reports across the country. The approach was developed in consultation with leading academic partners, including John L. Crompton, and has been reviewed by numerous tourism agencies across the country.

67 Travelers who visit these amenities spend money on food, travel, and lodging during their stay. The taxes generated are related to that spending (e.g., sales and lodging taxes).

68 This spending includes all purchases on their visit, including but not limited to lodging, gas, food in restaurants and grocery stores, gifts, and park entry fees.

69 The survey was conducted of a statistically representative sample of 400 residents of Livingston, Macomb, Oakland, Washtenaw, and Wayne Counties and was statistically representative of residents in the region with an accuracy level of plus or minus 4.9 percent. The survey instrument was conducted in English, surveying 50 percent of respondents via cellular telephones and 50 percent via landline telephones.

70 This value includes 48,700 uses by residents of mobile centers.

71 General park use includes activities such as picnicking, visiting with family and friends, relaxing, and visiting playgrounds.

72 The unit day values for recreation used by the U.S. Army Corps of Engineers range from $4.14 to $12.43 for general park use such as hiking on trails, and from $16.83 to $49.19 for specialized activities that require specialized equipment and expertise. Joseph H. Redican, *Memorandum for Planning Community of Practice: Economic Guidance Memorandum, 19-03, Unit Day Values for Recreation for Fiscal Year 2019*, U.S. Army Corps of Engineers, 2018.

73 Oregon State University, Recreation Use Values Database, accessed December 1, 2016, http://recvaluation.forestry.oregonstate.edu/database.

74 This is the consumer surplus value that is above and beyond what a person would pay to enter the park or participate in an activity. This analysis accounted for the cost of entry and is based on the estimated individual entry costs.

75 This recreational use value represents the value that residents would have to pay to engage in recreational activities if the park system did not provide them at low or no cost.

76 Adjusting for the overreporting of park use that occurs due to social desirability and recall bias is consistent with the literature. B. Wyker, K. Bartley, E. Holder-Hayes, S. Immerwahr et al., *Self-Reported and Accelerometer-Measured Physical Activity: A Comparison in New York City,* New York City Department of Health and Mental Hygiene, 2013, accessed June 8, 2018, http://www1.nyc.gov/assets/doh/downloads/pdf/epi/epiresearchpa_measures.pdf; Christopher G. Leggett, *Bioeconomics, Estimating Visitation in National Parks and Other Public Lands*, 2015, accessed January 11, 2019, https://rsginc.com/wp-content/uploads/2018/05/Leggett-2015-NPSNRDA-Report.pdf.

77 In 2018, Huron-Clinton Metroparks counted 2.91 million vehicle entries into the park system. The 2017 National Household Travel Survey by U.S. Department of Transportation, Federal Highway Administration, indicates that the average vehicle occupancy for social/recreation trip purposes is 2.10. This is consistent with other work by John Crompton to measure visitor counts and is considered standard practice among park districts. Applying this multiplier to the vehicle entries, indicates 6.1 million visits per year. However, this estimate is conservative because several parks and park facilities do not have tollbooths and therefore do not have permanent counters installed. In addition, these numbers do not take into account any non-vehicular (pedestrian/cyclist) entries.

78 David Rojas-Rueda, Mark J. Nieuwenhuijsen, Mireia Gascon, Daniela Perez-Leon, and Pierpaolo Mudu, "Green Spaces and Mortality: A Systemic Review and Meta-Analysis of Cohort Studies," *The Lancet* (2019).

79 P. Veugelers, F. Sithole, and S. Zhang, "Neighborhood Characteristics in Relation to Diet, Physical Activity and Overweight of Canadian Children," *International Journal of Pediatric Obesity* 3 (2008): 152–159; Ian Alcock, Mathew P. White, Benedict W. Wheeler, Lora E. Fleming, and Michael H. Depledge, "Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas," *Environmental Science and Technology* 48, no. 2 (2014): 1247–1255.

80 R. Buckley, P. Brough, L. Hague, A. Chauvenet, C. Fleming, E. Roche, E. Sofija, and N. Harris, "Economic Value of Protected Areas Via Visitor Mental Health," *Nature Communications* (2019), https://doi.org/10.1038/s41467-019-12631-6; Science X, Phys. Org., "National Parks a Boost to Mental Health Worth Trillions: Study," November 12, 2019, accessed January 13, 2020, https://phys.org/news/2019-11-national-boost-mental-health-worth.html.

81 M. R. Marselle, K. N. Irvine, and S. L. Warber, "Examining Group Walks in Nature and Multiple Aspects of Well-Being: A Large-Scale Study," *Ecopsychology* 6, no. 3 (2014): 134–147; Claude Bouchard, Steven N. Blair, and William Haskell, *Physical Activity and Health* (Champaign, IL: Human Kinetics, 2012); Ronald Sturm and Deborah Cohen, "Proximity to Urban Parks and Mental Health," *Journal of Mental Health Policy and Economics* 17, no. 1 (2014): 19–24.

82 Peter James, Jaime E. Hart, Rachel F. Banay, and Francine Laden, "Exposure to Greenness and Mortality in a Nationwide Prospective Cohort Study of Women," *Environmental Health Perspectives* 124, no. 9 (2016): 1344–1352.

83 A. H. Mokdad et al., "Actual Causes of Death in the United States, 2000," *Journal of the American Medical Association* 291 (2004): 1238–1245; Centers for Disease Control and Prevention, *The Burden of Chronic Diseases and Their Risk Factors: National and State Perspectives,* 2002, National Center for Chronic Disease Prevention and Health Promotion, 2003.

84 A. T. Kaczynski and K. A. Henderson, "Parks and Recreation Settings and Active Living: A Review of Associations With Physical Activity Function and Intensity," *Journal of Physical Activity and Health* 5, no. 4 (2008): 619–632.

85 Ming Kuo, "How Might Contact with Nature Promote Human Health? Promising Mechanisms and a Possible Central Pathway," *Frontiers in Psychology* 6 (2015): 1–8.

86 A. T. Kaczynski and K. A. Henderson, "Parks and Recreation Settings and Active Living: A Review of Associations with Physical Activity Function and Intensity," *Journal of Physical Activity and Health* 5, no. 4 (2008): 619–632; Chenoweth and Associates, *The Economic Costs of Overweight, Obesity, and Physical Inactivity Among California Adults—2006*, California Center for Public Health Advocacy, 2009; Janette Sadik-Khan and Seth Solomonow, "Improving Public Health by Making Cities Friendly to Walking and Biking," *Health Care Policy and Law* 177, no. 5 (2017): 613–614.

87 P. Veugelers, F. Sithole, and S. Zhang, "Neighborhood Characteristics in Relation to Diet, Physical Activity and Overweight of Canadian Children," *International Journal of Pediatric Obesity* 3 (2008): 152–159.

88 Robert Wood Johnson Foundation, County Health Rankings and Roadmaps, *Michigan 2019*, accessed December 3, 2019, https://www.countyhealthrankings.org/app/michigan/2019/compare/snapshot?counties=26_093%2B26_099%2B26_125%2B26_161%2B26_163.

89 The Trust for Public Land, 2020 Parkscore Index, accessed June 12, 2020, https://www.tpl.org/city/detroit-michigan.

90 Southeast Michigan Council of Governments, *Parks and Recreation Plan for Southeast Michigan*, 2019.

91 Statewide (32 percent of adults are obese), Livingston County (27 percent), Macomb County (32 percent), Oakland County (25 percent), Washtenaw County (24 percent), and Wayne County (34 percent). Robert Wood Johnson Foundation, County Health Rankings and Roadmaps, *Michigan 2019*.

92 Mike Wilkinson and Ted Roelofs, "Michigan Is Obese, Unhealthy and Dying Young. And That's Costing Billions," Bridge, April 24, 2019, accessed January 7, 2020, https://www.bridgemi.com/michigan-health-watch/michigan-obese-unhealthy-and-dying-young-and-thats-costing-billions.

93 Michigan Center for Nursing, "Obesity: Breaking Down the Costs," accessed January 7, 2020, https://www.michigancenterfornursing.org/news/reports-and-data/obesity-breaking-down-costs.

94 Many factors contribute to obesity in urban areas, including structural and environmental racism, socioeconomic status, and the lack of leisure time, as well as transportation constraints. This report focuses on the measurable role of parks have in increasing physical activity, acknowledging that other factors contribute significantly to population health.

95 Centers for Disease Control and Prevention, "How Much Physical Activity Do Adults Need?," accessed December 3, 2019, http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html.

96 B. Giles-Corti and R. J. Donovan, "The Relative Influence of Individual, Social, and Physical Environment Determinants of Physical Activity," *Social Science and Medicine* 54 (2002): 1793–1812.

97 K. E. Powell, L. M. Martin, and P. P. Chowdhury, "Places to Walk: Convenience and Regular Physical Activity," *American Journal of Public Health* 93, no. 9 (2003): 1519–1521.

98 M. A. Barrett and Daphne Miller, "Parks and Health: Aligning Incentives to Create Innovations in Chronic Disease Prevention," *Preventing Chronic Disease* 11 (2014).

99 Centers for Disease Control and Prevention, "General Physical Activities Defined by Level of Intensity," accessed December 28, 2018, https://www.cdc.gov/nccdphp/dnpa/physical/pdf/PA_Intensity_table_2_1.pdf.

100 M. Pratt, C. A. Macera, and G. Wang, "Higher Direct Medical Costs Associated with Physical Inactivity," *Physician and Sports Medicine* 28, no. 10 (2000): 63–70.

101 The Trust for Public Land used the unadjusted medical cost consumer price index to account for inflation. U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers, Not Seasonally Adjusted, U.S. City Average for Medical Care, www.data.bls.gov.

102 Roland D. McDevitt and Sylvester J. Schieber, *From Baby Boom to Elder Boom: Providing Health Care for an Aging Population* (Washington, DC: Watson Wyatt Worldwide, 1996).

103 U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, "The High Concentration of U.S. Health Care Expenditures," accessed December 4, 2019, http://www.ahrq.gov/research/findings/factsheets/costs/expriach/index.html#HowAre.

104 Richard Florida, *Cities and the Creative Class* (New York: Routledge, 2005).

105 Daphne T. Greenwood and Richard P. F. Holt, *Local Economic Development in the 21st Century: Quality of Life and Sustainability* (New York: Routledge, 2015).

106 Claire Hannum, "Why Ann Arbor, MI Is the #1 Best Place to Live in America," Livability, July 5, 2018, accessed September 26, 2019, https://livability.com/mi/ann-arbor/real-estate/why-ann-arbor-mi-is-the-1-best-place-to-live-in-america.

107 *U.S. News and World Report,* "Michigan," accessed September 26, 2019, https://www.usnews.com/news/best-states/michigan.

108 Southeast Michigan Council of Governments and Metropolitan Affairs Coalition, *Partnering for Prosperity: Economic Development Strategy for Southeast Michigan*, 2016.

109 Southeast Michigan Council of Governments, *Sustaining and Stabilizing: The Economic and Demographic Outlook for Southeast Michigan through 2045*, 2017.

110 Outdoor Industry Association, *Michigan*, accessed November 2, 2019, https://outdoorindustry.org/state/michigan/.

111 U.S. Bureau of Economic Analysis, "Outdoor Recreation Satellite Account, U.S. and Prototype for States, 2017," accessed September 27, 2019, https://www.bea.gov/data/special-topics/outdoor-recreation; Mike Wilkinson, Bridge, "Talk about Pure Michigan: Outdoor Pursuits Generate $10B, Report Says," September 23, 2019, accessed September 27, 2019, https://www.bridgemi.com/michigan-environment-watch/talk-about-pure-michigan-outdoor-pursuits-generate-10b-report-says.

112 Michigan Department of Natural Resources, "Office of Outdoor Recreation Industry," accessed September 27, 2019, https://www.michigan.gov/dnr/0,4570,7-350-79137_87865---,00.html; Courtney Soule, Model D, "Michigan to Join Confluence of States Bolstering Outdoor Recreation Industry," September 17, 2019, https://www.modeldmedia.com/features/Michigan-joins-Confluence-States-091619.aspx?utm_source=Emma&utm_medium=Email&utm_term=Michigan+to+join+Confluence+of+States+bolstering+outdoor+recreation+industry&utm_content=Newsletter&utm_campaign=Tiki%3a+The+more+fun+version+of+craft+cocktails; Confluence of States, "Founded on Common Ground," accessed November 21, 2019, https://www.confluenceofstates.com/our-team.

113 Jenny Phillips, REI Ann Arbor store manager, email message to author, November 1, 2019.

114 Esri, "Esri Business Analyst," accessed September 6, 2019, http://www.esri.com/software/businessanalyst.

115 The data analyzed here are from the Sports and Leisure Market Potential report and are based on national propensities to use various products and services, applied to local demographic composition. Usage data were collected by GfK MRI, a leading market research firm, in a nationally representative survey of U.S. households.

116 The MPI is tabulated to represent a value of 100 as the overall demand for the United States. An MPI of more than 100 represents high demand; a value of less than 100 represents low demand. For example, an MPI of 120 implies that demand is likely to be 20 percent higher than the national average.

117 The SPI is tabulated to represent a value of 100 as the overall spending for the United States. When the SPI is equal to 100 for a specific type of merchandise, consumers are spending at a rate equal to the national average. The SPI is an indicator of what level of discretionary income consumers are willing to devote to a particular good or service.

118 This spending category includes exercise equipment and gear, and game tables.

119 This spending category includes docking and landing fees for boats and planes, camp fees, and payments on boats, trailers, campers, and RVs, as well as the rental of RVs or boats.

120 Esri, "Esri Business Analyst," accessed September 6, 2019, http://www.esri.com/software/businessanalyst.

121 Hunting is not permitted within the Huron-Clinton Metroparks system; however, Metroparks are part of the larger tapestry of parks and conserved lands across the region that provides access for recreational activities including hunting and fishing. Unfortunately, data do not exist to isolate the portion of spending on hunting and fishing equipment that is specifically hunting- or fishing-related. Thus, this document reports the spending for the category as a whole, to indicate the importance of Huron-Clinton Metroparks and publicly accessible lands more generally that support the hunting and fishing sector of the economy.

122 Nathan Pound, owner, Skip's Huron River Canoe Livery, email message to author, September 15, 2019.

123 The number of businesses was determined based on NAICS codes 42391 (sporting and recreational goods and supplies merchant wholesalers) and 45111 (sporting goods stores). Within each category, relevant codes were extracted for inclusion in this analysis and all others excluded. For instance, codes 45111044 (skateboards and equipment retail) and 42391022 (gymnasiums equipment and supplies–wholesale) were excluded because Metroparks do not offer skateboarding or gymnasium amenities. Conversely, 42391018 (fishing tackle—wholesale) was included because fishing is one of the activities provided by Metroparks. In addition, some codes such as saddlery and harnesses (45111041) were excluded from the analysis to be conservative because even though Metroparks play a significant role in providing horseback-riding trails to the region, a large portion of the horse-related businesses cater to competitive riding rather than trail riding.

THE TRUST FOR PUBLIC LAND

The Trust for Public Land
101 Montgomery St., Suite 900
San Francisco, CA 94104
415.495.4014

FRONT TOP: HURON-CLINTON METROPARKS; FRONT BOTTOM: HURON-CLINTON METROPARKS;
BACK: HURON-CLINTON METROPARKS

tpl.org