Accessible Exercise: Improving Parks and Recreation in the City of Pontiac

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Health Sciences

To
The Honors College
Oakland University

In partial fulfillment of the
requirement to graduate from
The Honors College

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February 15, 2018

Abstract

Parks and Recreation Master Plans help communities identify and prioritize recreational needs for diverse populations. This project contributed to redevelopment of the city of Pontiac's Parks Plan by recording geographic and pictorial information in twelve parks for use in identifying barriers to accessibility affecting residents with physical disabilities. The parks were selected using existing disability and lifestyle data, council district location, and size. Facilities were assessed with a GPS device and geographic information system (GIS) software. Accessibility features were photographed, assigned location information, and organized into a comprehensive map. Multiple barriers were discovered, including uneven or non-unitary ground surfaces and a complete absence of accessible restrooms, parking, and pathways in 100% of parks assessed. These findings will be integrated into redevelopment of the Pontiac Parks Plan. Proposed short-term solutions included improved grass maintenance, pathway clearing, and redesigning parking areas to improve access for those with disabilities. Long-term proposals included play areas with unitary ground surfaces, new pathways to connect existing park facilities, and restoring restroom facilities. Integrating these solutions into Master Plans will encourage and enable Pontiac’s disabled population to use the park system, leading to a higher number of physically active residents with improved health status.

Introduction

The community-engaged research performed as part of this project collected new information about Pontiac's urban parks and recreation areas. An official park accessibility audit has not been performed in Pontiac since 2011, during which surveyors concluded that “the majority of [city park] facilities are not accessible” (Schimmel & Jukowski, 2012). This project aimed to contribute to Pontiac's new Parks and Recreation Master Plan by collecting updated information on park attributes and accessibility using GIS data and existing research as a guide. This data was compared against county accessibility guidelines to propose modern solutions to accessibility violations for use in building the new plan. These findings will potentially allow Pontiac residents to lead more active lifestyles in the near future.

The logic model for this project identifies inputs, activities, expected outputs, intermediate outcomes, and long-term outcomes. Inputs included myself as the data collector and local experts from Oakland County Executive, including Kristen Wiltfang, Senior Planner, from the Oakland County Economic Development & Community Affairs Department. Activities performed included facility assessments using a GPS and the collection and organization of location data and images using GIS software. The outputs of the project were the identification of several barriers to accessibility and suggested improvements to the Parks and Recreation Master Plan. Intermediate outcomes involved increased awareness of accessibility issues among individuals and the community, and the disabled population beginning to use and care about the park system. Continued improvements of the Master Plan through 2023 and a higher number of physically active residents were suggested as long-term outcomes.

A theory of change was also developed for the project. Data collection methods included identifying park accessibility features using a GPS device and GIS software and retrieving the

location of disabled individuals from census data. The central health determinant objective was improving city park access for those with physical disabilities. The central behavioral and environmental objective was increasing use of city parks for exercise and recreation. The overall health goal was identified as raising the number of Pontiac residents who engage in physical activity regularly.

Materials and Methods

Park design and layout analysis has been performed by many cities in recent years, with public health professionals creating studies to determine the impact of successful planning on the activity level of a community. The specific data collection tools used by these cities have been documented with the expectation that other cities will work towards similar improvements. A common tool used to evaluate park space in a city is a GIS, or geographic information system (Oh & Jeong, 2007). In urban planning, this system is used to determine how a park's location, accessibility, and amenities affect those who live nearby. Using this tool, ample park space has been shown to be closely related to higher physical activity levels in an immediate area (Brown, Schebella, & Weber, 2014). A systematic review of twenty-one similar urban park studies has been published in the academic journal *Health & Place*, drawing the conclusion that "physical attributes of parks... may influence physical activity patterns" (McCormack, Rock, Toohey, & Hignell, 2010). Encouraging exercise among disabled individuals is particularly important, as a sedentary lifestyle is nearly twice as prevalent among disabled adults compared to adults without physical disabilities (Carroll et al., 2014).

Initial population data was collected with the help of Kristen Wiltfang using PolicyMap (Reinvestment Group, 2017), an online service which provides demographic and quality of life

information using tracts from the 2010 U.S. Census. This tool was used to identify regions of Pontiac where a significant portion of residents reported a disability, as well as regions of the city where residents reported having no personal vehicle. Specific emphasis was placed on areas where residents under the age of eighteen reported having a disability, as this subset contains the target demographic for children's play areas placed in city parks. PolicyMap data was composited with the boundaries of the seven city council districts of Pontiac (City of Pontiac, 2014). The resulting map was used as a base from which to select parks that served a large number of nearby disabled residents, while ensuring that every city district was represented by at least one park.

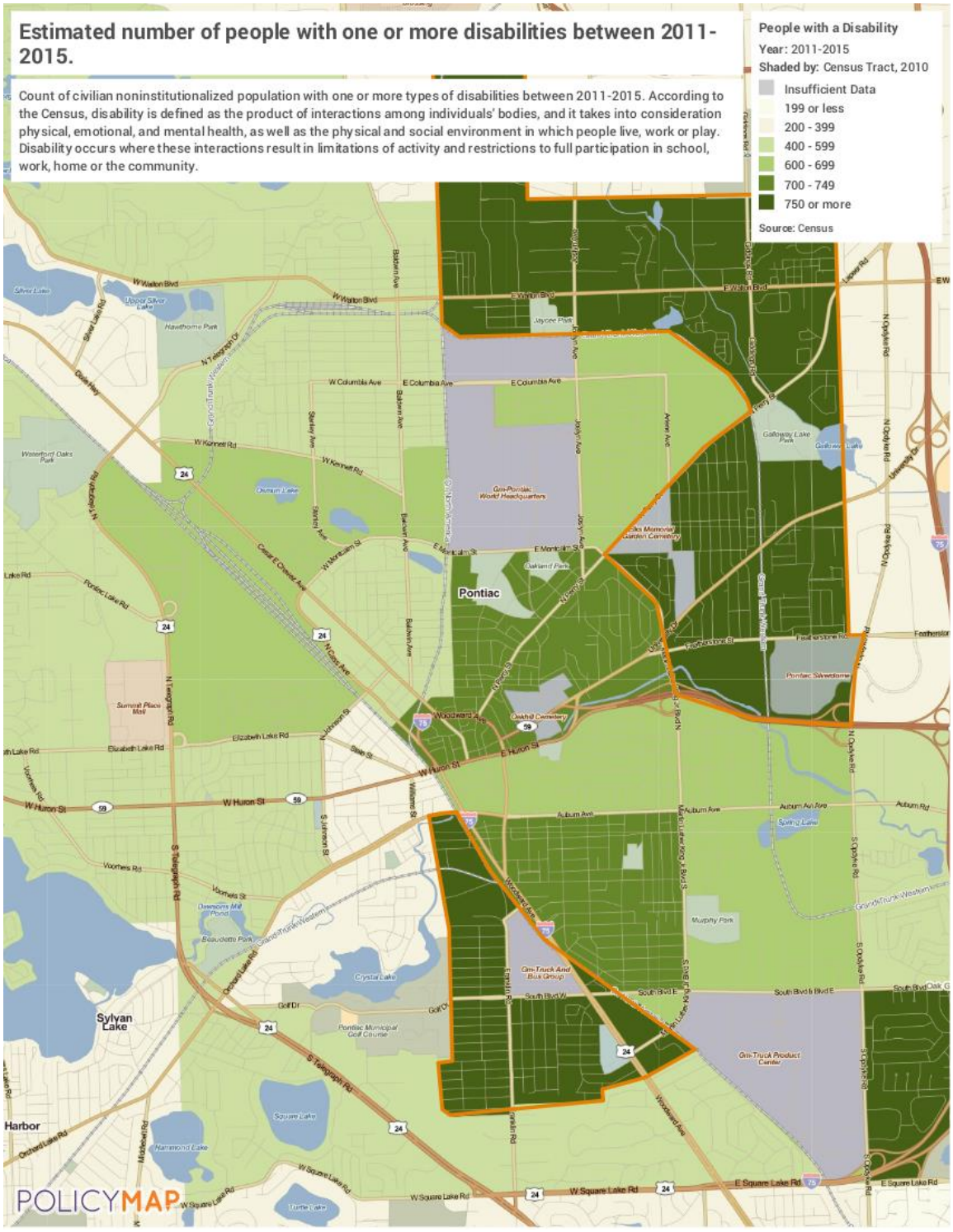


Figure 1. A sample of disability data collected using PolicyMap, which is organized by census tract.

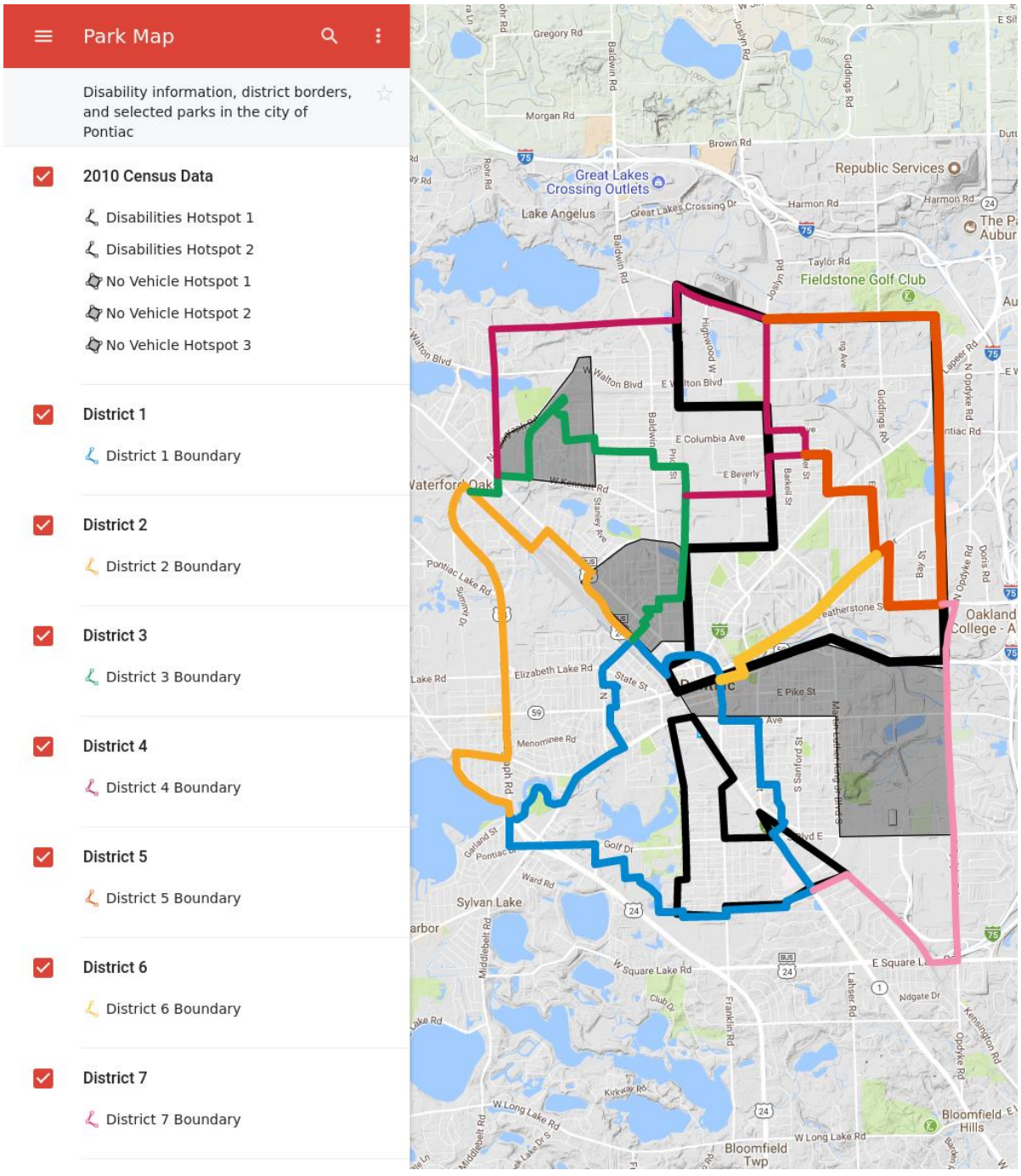


Figure 2. The completed composite base map, showing the council district boundaries and areas with prominent disabled populations and a significant lack of vehicle ownership.

The project aimed to collect information on at least ten parks, with at least three being larger community parks. Based on their location relative to census data hotspots, the following parks were selected as the best initial candidates: Fisher Street Park in District 1, Indian Village Park in District 2, Lakeside Park in District 3, Cherrylawn Park in District 4, Jaycee Park in District 4, Galloway Lake Park in District 5, Art Heaton Park and Madge Burt Park in District 6, Charlie Harrison Park in District 6, Murphy Park in District 7, and South Kiwanis Park in District 7. Art Heaton Park and Madge Burt Park were treated as a single unit due to their small size and very close proximity to one another along the same street, bringing the initial number of planned parks to eleven. The completed project surpassed this goal by collecting additional information in North Kiwanis Park, bringing the total park count to twelve.

When visiting each park, identification information was recorded into a coded spreadsheet. Before visiting each park, initial metadata was recorded including the name of the park, the date the park was visited, the council district in which the park was located, and the type of park: community, neighborhood, or mini. An inventory of facilities was conducted during each park visit which reported the presence of fishing piers and observation docks, picnic tables, cooking surfaces, children's play areas, sports areas, permanent restrooms, clearly marked parking spaces, and signage.

ParkID	Date	Name	District	Type		
				Mini	Neighborhood	Community
FSP	2017-08-21	Fisher Street Park	1	•		
IVP	2017-08-16	Indian Village Park	2	•		
LSP	2017-08-08	Lakeside Park	3		•	
NKP	2017-08-09	North Kiwanis Park	3		•	
CLP	2017-08-07	Cherrylawn Park	4		•	
JCP	2017-08-12	Jaycee Park	4			•
GLP	2017-08-12	Galloway Lake Park	5			•
AHP	2017-08-10	Art Heaton Park	6		•	
MBP	2017-08-10	Madge Burt Park	6	•		
CHP	2017-08-11	Charlie Harrison Park	6		•	
MHP	2017-08-21	Murphy Park	7			•
SKP	2017-08-16	South Kiwanis Park	7		•	

Figure 3. The park metadata spreadsheet. The "ParkID" is a unique three-character string representing a park used to easily cross-reference data tables.

After a park visit, specific observations related to certain facilities were recorded, including play area access ramps and wheelchair transfer stations, ground surfaces, and sports area seating and entranceways. Park accessibility guidelines detailing proper facility design have been compiled by the Michigan Department of Natural Resources (2016). These standards describe park boundaries, recreation equipment, barrier-free design strategies, and the expected status of essential facilities such as restrooms and parking. According to the standards, play areas should rest on a unitary surface, such as poured or tiled rubber, rather than a non-unitary surface such as woodchips, grass, or dirt. They should also feature either ramps or transfer points for

wheelchair access. Paths and walkways should also be unitary and reasonably level. Sports areas should maintain a clear perimeter for easy maneuvering. Picnic tables are expected to maintain clear, level space around the usable sides of the table, as well as provide one wheelchair space per 24 feet of table surface - in other words, one space at a typical four-person picnic table. Cooking surfaces should be raised off the ground for ease of use. Permanent restrooms should be present and furnished with fixtures of an appropriate height. Accessible parking spaces should be present in parking lots and clearly marked as reserved for use by those with disabilities. Navigational and regulatory signage, such as safety warnings, should be present and easily readable.

Park accessibility information was recorded using a Garmin® Oregon® 650t global positioning system. At select points throughout the parks, waypoints containing location and time information were recorded along with a photograph. These photographs documented accessibility features or problems specific to the type of facility being documented. Each waypoint was automatically assigned a unique three-digit identifier, starting with 001. Tracks were also recorded to mark the location and layout of paths and trails. When recording a track, the GPS recorded data at a set interval as it moved along a path. After visiting a park, waypoints and tracks were exported to a computer in .GPX format. Images were also copied from the device.

The .GPX files were processed using Google Earth Pro, free software with the ability to "visualize, manipulate and export GIS data" (Google, 2017). Exact location data was cleaned as necessary to account for poor satellite reception and unneeded waypoints were deleted. The image files were renamed to match their corresponding waypoints. These renamed images were imported into Google Earth Pro and attached to their corresponding waypoints for easy viewing.

The completed data set was combined with the previously planned composite map and exported as a single, self-contained compressed archive viewable on any machine. This archive is coded in a standardized format known as Keyhole Markup Language, or KML (Open Geospatial Consortium, 2017). Most GIS software can read this data, including Google's own My Maps, a companion service to Google Earth Pro designed for customizing and sharing location data online.

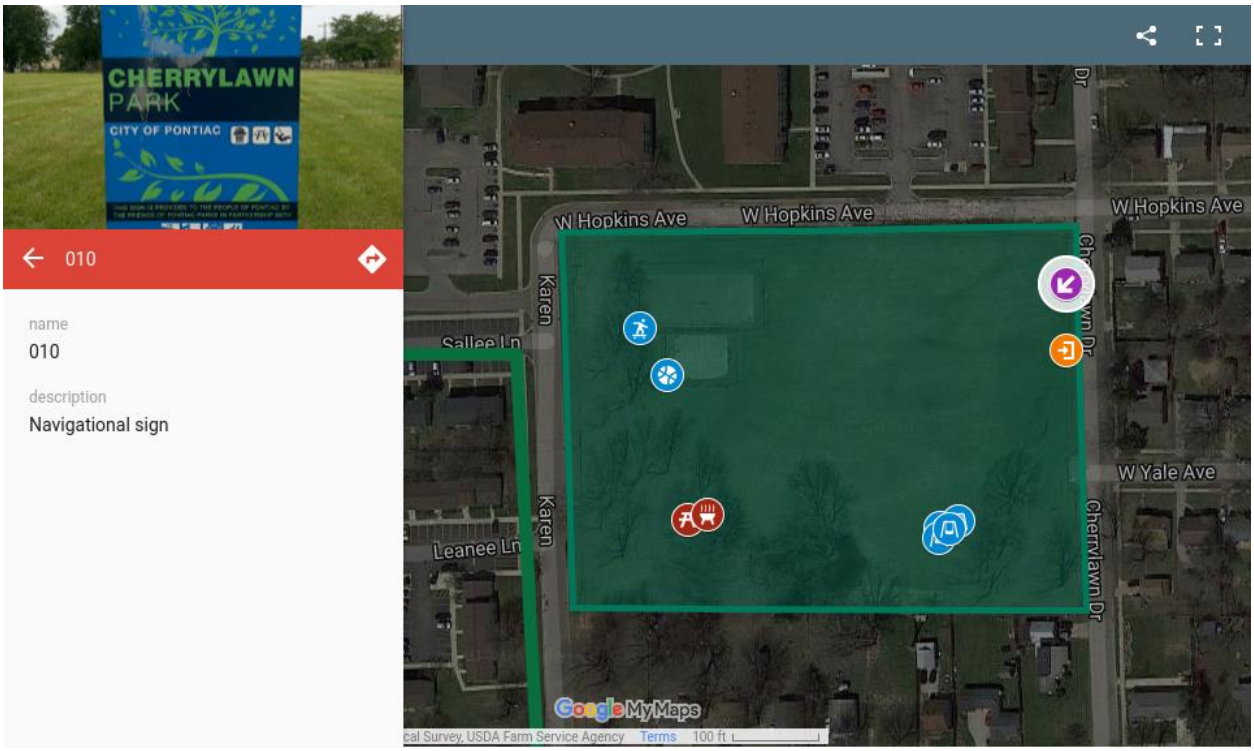


Figure 4. A portion of the data as seen in Google My Maps. Data is organized by waypoint number.

Results

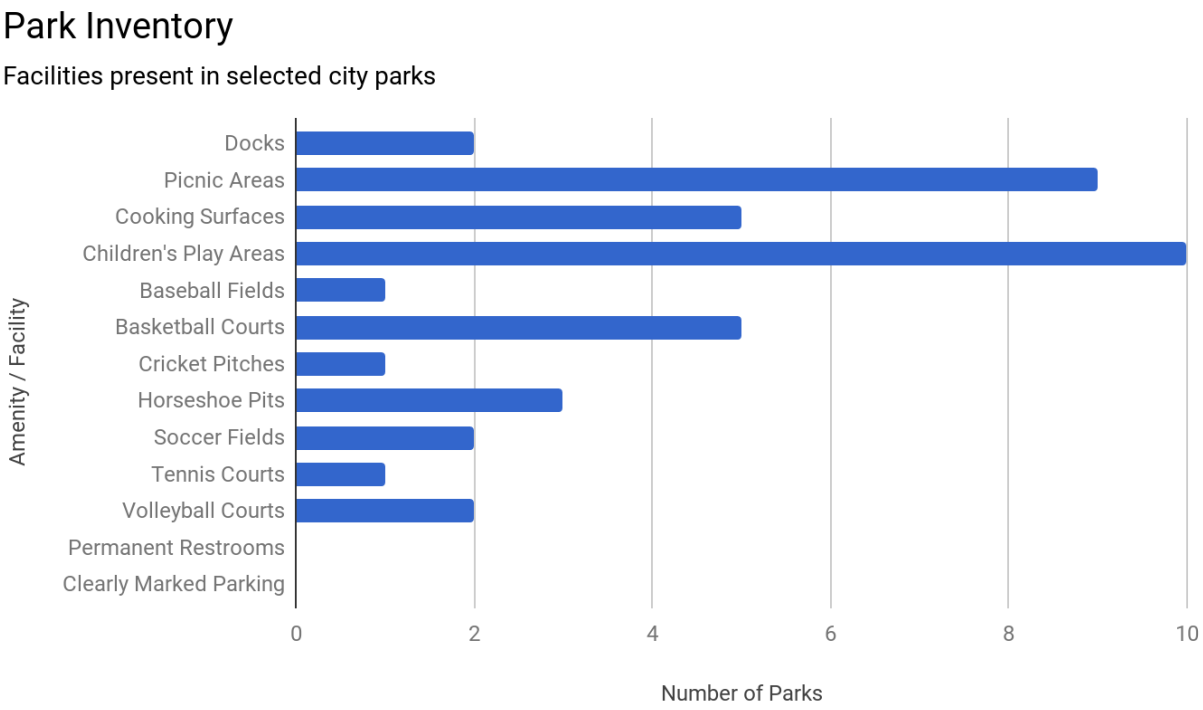
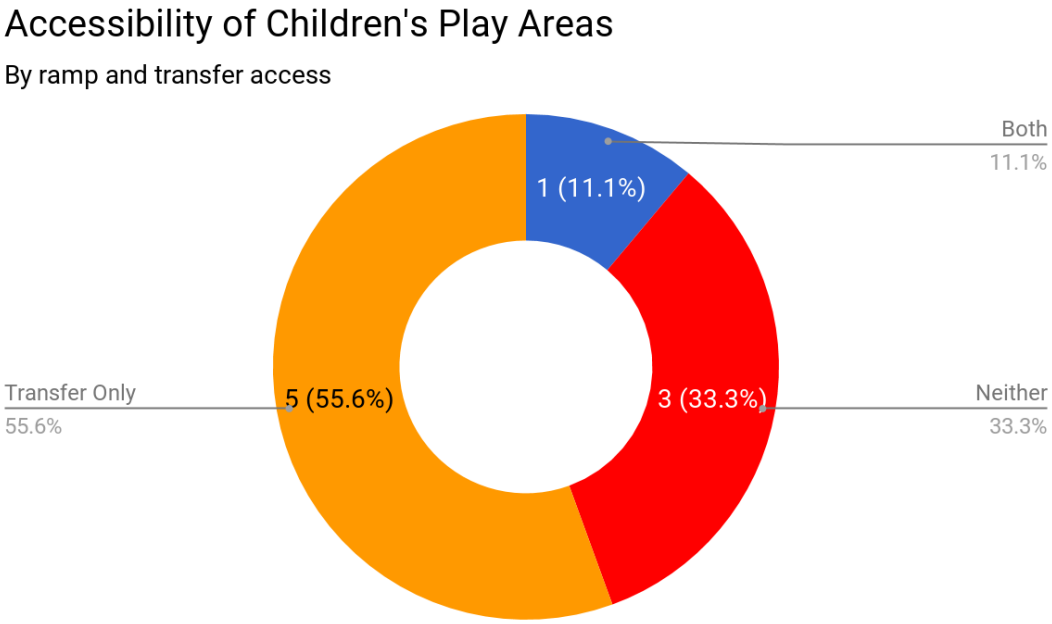


Figure 5. A summary of facilities available in the city parks where data was collected. Playgrounds and picnic tables were the most common facilities, while permanent restrooms and marked parking were not present in any of the twelve parks.



Figures 6 and 7. 3 of the 10 play areas recorded featured neither a ramp nor a wheelchair transfer point, rendering them inaccessible. By the ground surface metric, none of the play areas were accessible as none rested on a unitary surface (for example, tiled rubber).

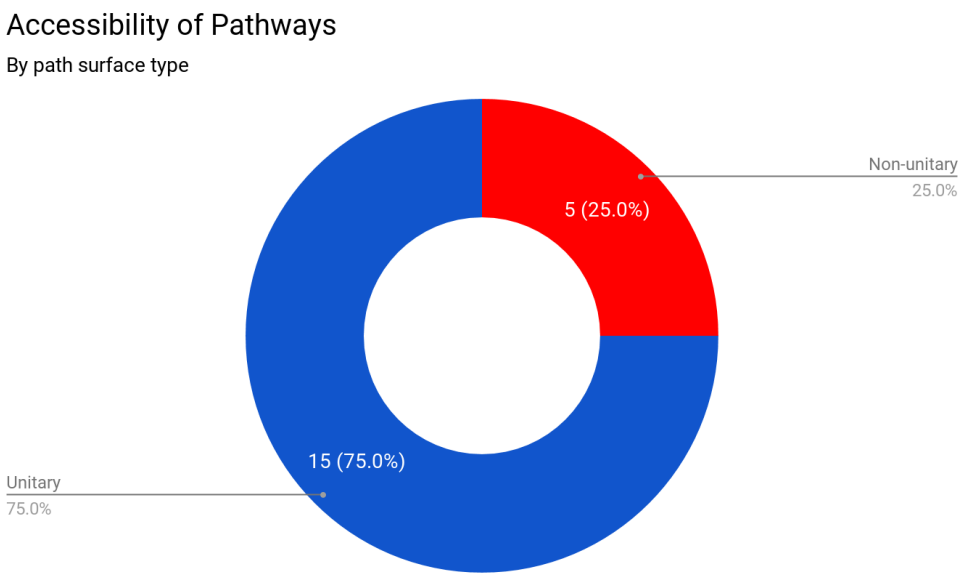


Figure 8. Only 75% of park walkways were accessible to wheelchair users and those with assistive walking devices.

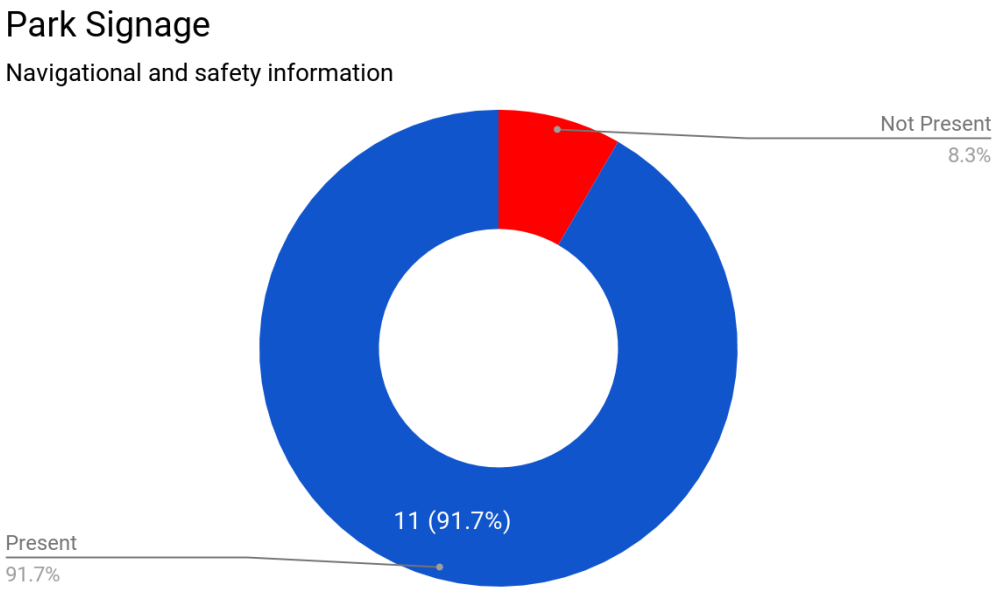


Figure 9. Of the twelve parks visited, only one - South Kiwanis Park - was not identified by a navigational sign.

The following table contains a sample of the pictorial information collected during the project. The complete image set is disseminated in an online archive at https://accessibleparksproject.org along with location data.

GPX	Description	Image
003	Entrance to the Cherrylawn Park play area. Although a ramp is installed, its poor positioning renders it useless. Implementation issues such as this are seen in park equipment throughout the city.	
007	Although they are in various states of repair, most cooking surfaces in the city parks are placed at a reasonable height.	
033	Most children's play areas in the city, such as this recently installed play area in North Kiwanis Park, rest on a non-unitary surface. The city would benefit from the use of a unitary surface, such as poured rubber, in at least one centrally located play structure.	

037	An example of clearly readable navigational signage. Note the easily understandable pictures representing the park's various amenities.	
047	A transfer point allowing access to a play area from a wheelchair in Madge Burt Park.	
054	Many sports areas in city parks don't offer sufficient perimeter space for people to maneuver. The fence in this example from Art Heaton Park is placed directly against the active area of the basketball court.	

059	One of the best attempts at an accessible entrance to a play area, seen in Charlie Harrison Park.	
074	Vehicle barricades, such as this one leading to the dock in Galloway Lake Park, often have the unintended effect of hindering accessibility.	
077	A great example of an accessible picnic table in Galloway Lake Park. Although it does not have wheelchair seating, the surface surrounding and leading to the table is clear, level, and unitary.	

088	Pathways to park facilities have become unusable, such as this pathway between parking and the soccer field in Galloway Lake Park.	
094	This recently constructed basketball court in Galloway Lake Park is a great example of an accessible sports area with maneuvering space.	
103	Many parks have permanent restroom facilities that have fallen into disuse, including Jaycee Park. Portable toilets, while a necessary solution, offer very limited accessibility.	

110	An unmaintained picnic table in Jaycee Park.	
114	Despite being a recent addition to Jaycee Park, these baseball stands are only accessible by stairs.	
142	Many picnic tables are placed on a level, unitary surface, but would benefit from a pathway connecting them to parking or the street.	

Discussion

This research will be presented to the city of Pontiac in 2018 in coordination with the revised Master Plan. I will work with Kristen Wiltfang and the Master Plan Steering Committee to share these resources with the City Council and City Leadership. The waypoint and image data collected during this project has been packaged and made publicly available; it will be updated as necessary as development of this project continues.

As they are the most widely installed facility in the city parks, improving children's play areas would be one of the most effective short-term changes. Switching to unitary play surfaces would likely be cost-prohibitive, but better grass maintenance would be a small step in the right direction while also improving the appearance of these areas. This could encourage more people to visit and care about these parks. Another short-term goal would be repairing or weeding existing pathways, as many are entirely inaccessible even to people who are not physically disabled.

A long-term goal would be the development of new pathways to connect facilities such as picnic tables and sports areas that are currently only reachable by grass or dirt. As before, improving park appearance is an important step towards promoting awareness. Larger parks would also benefit from designated accessible parking spaces and the restoration of previously used restroom facilities. This would show the community that the city is considering the needs of those with disabilities, encouraging park use. If the parks clearly show that they are making an effort to cater to the disabled, more of these residents may use the city parks to exercise in the future.

This project was constrained by several limitations. Disability information as provided by the census is an aggregate; physical, emotional, and mental disabilities are not separated. As a

result, large populations of disabled individuals were assumed to contain proportionally large populations of those with physical disabilities. To avoid this issue, researchers would need to design a study to collect this data rather than rely on census information. The maximum and average change in slope for each pathway was intended to be part of the data set assessing their ease of use, but the resolution of the collected GPS track data proved too low to yield any usable results. A dedicated accelerometer may be better suited for this purpose.

Sources of errors and bias may have affected the results of this project. It is possible that certain facilities exist at some parks and were missed during inventory, leading to them being incorrectly reported as not present. This would be best checked through replication of the study. Additionally, some areas were only partially evaluated during GIS data collection as to avoid disturbing members of the community using park facilities, most notably sports areas where a game was in progress. There was not sufficient time to return to these areas later.

Biographical Note

My name is Corey Rowe and I am a third-year student with senior standing at Oakland University. I am majoring in health sciences with a concentration in pre-pharmacy. I am an active member of the HealthPro Start OU organization, an accelerated "three plus one" graduate admissions program. Starting in the fall of 2018, I plan to attend pharmacy school at Wayne State University. Public health has always been an area I enjoy investigating, specifically with regards to policy planning and data analysis techniques. I also have a passion for computer science, which has given me a personal understanding of the importance of accessibility through contributions I've made to web content designed for use by university students with disabilities. This project allowed me to explore the physical side of accessibility in a fashion that runs parallel to my career path. My long-term goal is to become a pharmacist in a hospital setting with an emphasis on informatics. I've had many opportunities to strengthen my knowledge of the chemical and biological concepts pertinent to pharmacy, but this was first opportunity to apply public health concepts to a community setting. Knowing how to understand and work with the needs of different individuals will prove invaluable once I become a practicing pharmacist.

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