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Impact of COVID-19 on Ohio's National Parks Visitation

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Impact of COVID-19 on Ohio's National Parks Visitation

The University of Akron

School of Exercise & Nutrition Sciences

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Honors Project

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Abstract:

The COVID-19 pandemic has fundamentally changed the way in which society operates in order to get the novel disease under control. Businesses throughout the United States have had to close or reduce provided services, stay at home orders have secluded many people, and social distancing limits contact between others so many are turning to the parks system to cope with these changes. This study aims to find how the visitation of national parks in Ohio have been affected through the first six months of the pandemic. Visitation statistics were compared from March to August of 2020 to those same months of 2019 to investigate whether or not the pandemic has caused a statistically significant change in visitors. Seven of the eight parks saw statistically significant decreases in visitation. Further investigation into local, state, and national parks during the pandemic can provide a clearer idea into the use and importance of this system.

Introduction:

With the ongoing COVID-19 pandemic, the national parks throughout the United States have played an important role in providing a source of relatively safe recreation for Americans. Multiple studies confirm the manner in which this infection spreads is enhanced in an indoor or enclosed area. Early on it was found that gyms were shown to have an increased risk of infection due to the type of air filtration being used as well as the occupancy of the facility (Andrade, Dominski, Pereira, Liz, & Buonanno, 2018). Along with the increased proximity of members of exercise facilities, increased respiratory exertion can be a compounding issue with indoor activities. In one study, it was found that from August 24th to September 1st, 2020, nearly 70% of those who attended physical activity classes at a gym in Chicago had been identified to have COVID-19 after previously being checked for symptoms, having their temperature taken, and wearing a mask before being allowed to enter the facility (Lendacki, Teran, Gretsch, Fricchione,

& Kerins, 2021). When researching indoor versus outdoor transmission in general, it has been found that only during times with low wind, a stable atmospheric pressure, and crowded areas does outdoor transmission come close to that of indoor transmission (Rowe, Canosa, Drouffe, & Mitchell, 2021). In regards to outdoor transmission there has been evidence provided that indicates outdoor activities are much less likely to result in the spread of respiratory illnesses. In the case of outdoor transmission of COVID-19, it was found that the probability of spreading the disease outdoors was nearly 19 times less than spreading it indoors, but this is also dependent on the amount of time spent together in close proximity as well as if the group is wearing personal protective equipment (Bulfone, Malekinejad, Rutherford, & Razani, 2020). These previous studies exemplify the increased risk that indoor activities, even when not vigorous, can pose during a respiratory pandemic compared to outdoor activities.

There are eight national parks located throughout Ohio providing different services from hiking trails, camping areas, historical museums, and more. In Ohio, stay at home orders began in March to slow the spread of the coronavirus which ultimately resulted in the closure of nonessential businesses like workout facilities, movie theatres, restaurants, and more. This severely limited the amount of leisure activities that could be enjoyed throughout the state and could have possibly pushed many residents to turn to the national parks situated throughout Ohio for some form of recreation.

The purpose of this study was to investigate how the closure of these nonessential businesses in mid-March to May effected park visitation as well as looking at how park visitation was affected after these orders were eased in late May until August throughout the state. To do so, visitation statistics were gathered from the National Parks Service website from March of 2020 to August of 2020 and compared these monthly visitation numbers to those of the same

month during the previous year without stay at home orders. This data allowed us to formulate ideas of how well the people of Ohio are reacting to the coronavirus pandemic. This includes how the ability to be socially distanced in different parks, the ability to exercise in the parks, as well as how accessibility has affected visitation. By understanding these factors, we can use these visitation statistics to formulate ideas on how the people of Ohio are using these parks during the pandemic.

Literature Review

With the ongoing research behind COVID-19 and the impact that it has had on many different aspects of everyday life, the impact it has had on visitation to park systems and how they benefit us has been studied closely. There is an understanding that physical activity in the outdoors can have positive benefits for the body and mind and this is explored more by Slater, Christiana, and Gustat (2020). In their article, it is noted that per the CDC and American Public Health Association, exercising outdoors greatly increases overall health through a multitude of ways. By being active and visiting a green space, a person can lower their chances of heart disease, obesity, stroke, diabetes, as well as decrease feelings of anxiety and depression (Slater et al., 2020). Even with all of these positive benefits, many outdoor recreational areas were closed during the early stages of the COVID-19 pandemic and some still remain closed or have limited use. Fortunately, the likelihood of contracting COVID-19 from one of these green spaces is extremely low if guidelines are followed such as staying 6 feet apart, wearing a facial covering, and keeping conversations with non-household members to 10 minutes or less (Slater et al., 2020). One of the most glaring problems that many have faced during this time is not that the parks have been closed, but that there are very few parks or other types of green spaces around their residencies at all. Slater et al. (2020), have even suggested that by simply being outside in

an urban area, can have close to the same health benefits as being in a green space. This has led the authors to suggest health initiatives such as open streets or reduced speed streets in order for those in urban populations to get outside and be active. Overall, the effect of being outside and active increases mental and physical health and wellbeing but there needs to be better access to the park systems.

In Dehui, Innes, Wu, and Wang's article (2020), the authors investigate how green spaces can benefit those who visit them. The research team used Google's Community Mobility Reports and the Oxford Coronavirus Government Response Tracker to gather data on park visitation and compared them to 2019's visitation numbers (Dehui et al., 2020). As stated in the previous article, green spaces provide positive health benefits for those who indulge in activities located there, as well as increase community cohesion and city sustainability. In their study, they found that at the beginning of the pandemic, visitation numbers initially fell in late 2019 globally, but by January 3rd, 2020 to February, 6th 2020 visitation numbers had actually reached pre-pandemic levels or increased (Dehui et al. 2020). The scale at which park visitation increased was dependent on time and the location of the countries that were studied. In places like Italy, Spain, South Korea, and others, park visitation increased between 0-50% towards the start of the pandemic, compared to the UK, Denmark, and Canada where visitation increased over 100%. The researchers concluded that this increase could have most likely been the result of people using green spaces to reduce the negative effects of social isolation, increased personal time due to a lack of commuting to and from work, and the limited selection of activities due to the closure of public spaces such as shopping centers or restaurants.

In Razani, Radhakrishna, & Chan (2020) article, the authors emphasize the importance of the parks system during the ongoing COVID-19 pandemic. The authors point to the fact that with

the shutdown of parks, the mental health and economic cost of social distancing and stay at home orders begin to take a higher toll especially on those in lower socioeconomic classes as well as for children (Razani et al., 2020). With this being said, the authors lay their case for keeping parks open during the pandemic because of the positive factors that they bring to the community. Razani et al. (2020) explain that parks are used as a space to relieve stress as well as provide an area that children and adolescents can use for play and physical activities. These spaces are important for getting people to be active in a time where fitness centers may be closed or the area surrounding the home may not be as safe as the park. Parks also allow people to be in a social environment without having to socialize with others. When spending time outdoors with others nearby, this can help reduce the feelings of isolation that many people may experience with COVID-19 restrictions (Razani et al., 2020). The authors make clear that the use of parks and other public lands is an important factor in combating the mental and physical toll that COVID-19 restrictions can place on the populace.

Andrade et al., (2018) discuss how influenza and tuberculosis are spread within fitness facilities. Through their investigation, the authors found that those exercising indoors could face the risk of infection that could be as high as 25% depending on time of day as well as the type of air filtration that is being used in the facility (Andrade et al., 2018). The risk of infection in this article was focused on the particles that are left in the air from heavy breathing by those who are exercising but the article failed to mention the possibility of getting an infection from particles left over on equipment or the surfaces around the gym as well. Had the researchers looked into these factors as well, the risk for infection may have been even higher. This article clearly demonstrates the problem of viral infections in an enclosed space that a park may not face.

Methods

Participants

The parks used in this study include national parks in the state of Ohio. These include: Cuyahoga Valley National Park, James A. Garfield National Historic Site, First Ladies National Historic Site, Perry's Victory and International Peace Memorial, Hopewell Culture National Historic Site, Charles Young Buffalo Soldiers National Monument, Dayton Aviation Heritage National Historic Site, and William Howard Taft National Historic Site. These national parks vary in the fact that they are either open green spaces or enclosed areas that offer a look into the past and allow for mostly educational purposes. The parks that offer open space include Cuyahoga Valley National Park, Perry's Victory and International Peace Memorial, and Hopewell Culture National Historic Site. James A. Garfield National Historic Site, First Ladies National Historic Site, Charles Young Buffalo Soldiers National Monument, Dayton Aviation Heritage National Historic Site, and William Howard Taft National Historic Site are predominately indoor facilities. All data collection and calculations were completed on Microsoft Excel.

Study Design

This study follows the within-group design. All of the data used for the study was collected from the National Parks Service visitors-use statistics. The independent variable used in this study was the visitation numbers from 2019 when there were no large scale closures of businesses or stay at home orders. The dependent variable used in this study is the visitation numbers from 2020 during the COVID-19 pandemic. The confounding variables include the closure of nonessential businesses such as workout facilities, restaurants, consumer goods stores, etc. Along with these, was the need to limit time in enclosed spaces while being socially distanced at least six feet from those who were outside of one's own home.

Study Procedure

First, the parks' visitation numbers were put into table format in chronological order starting in March 2019 until August of the same year. The data from the same months in 2020 was then compared to the data from 2019 to give the change in percent of visitors between the two years. The calculation used for this was, % change = $|(2020 \text{ visitation}/2019 \text{ visitation} - 1)|$. Next, a two means *t*-test assuming equal variances was run in excel to find if there was a significant difference between the two years for each park with a *p* value ≤ 0.05 indicating statistical significance. With the use of this data, conclusions on how the people visiting Ohio's national parks was made. These include an idea into how well the people visiting the parks are taking the advice of public health officials when it comes to social distancing and limiting time in enclosed spaces. Also, with the closure of nonessential businesses, parks that include open green spaces provide a space for exercise with the closure of fitness facilities. After lockdowns were concluded in May, visitation numbers were used to draw conclusions on if people continued to be cautious about the COVID-19 by keeping away from enclosed parks and visiting parks with open spaces.

Results

Of the three national parks that were designated as open green spaces, only Cuyahoga Valley National Park saw consistently larger crowds than the previous year's attendees. Perry's Victory and International Peace Memorial saw a slight upward trend in visitation in the early months of the pandemic but quickly began to see far fewer visitors than in previous years. The Hopewell Culture National Historical Park was the only open green space to see no improvements in visitation when comparing pre and post pandemic visits. Of the three open green space parks that were studied, Perry's Victory and International Peace Memorial and

Hopewell Culture National Historical Park both showed significant decreases in visitation, $p = 0.04$ and 0.01 respectively. During this period, Cuyahoga Valley National Park showed an increase in visitation with a p value of 0.08 . A visual representation of the changes in visitation during the COVID-19 versus before the COVID-19 for the open green space parks are represented in figures 1-3.

Figure 1

Average monthly visitation to Perry's Victory and International Peace Memorial (PIVI) during and before the Covid-19 pandemic.

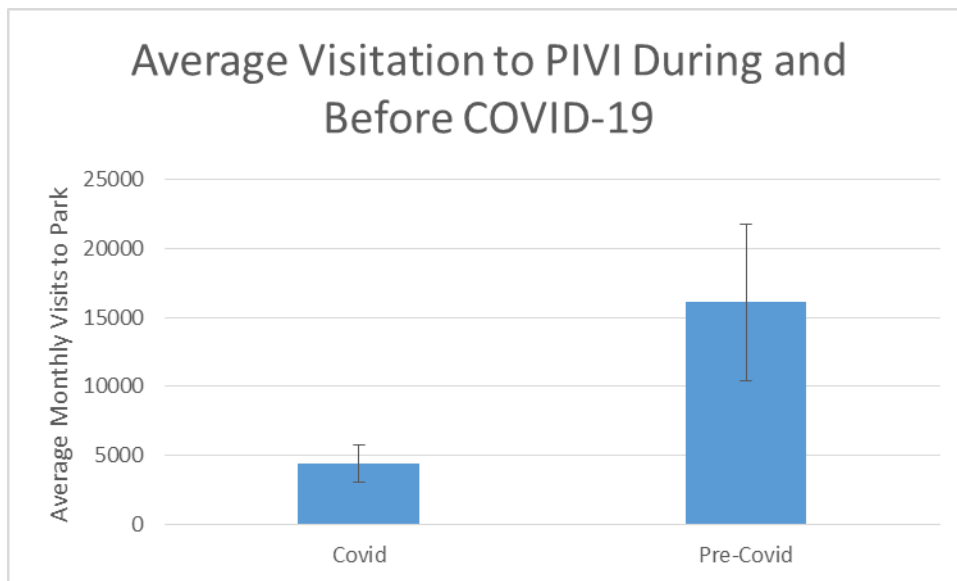


Figure 2

Average monthly visitation to Hopewell Culture and Historic Park (HOCU) during and before the Covid-19 pandemic.

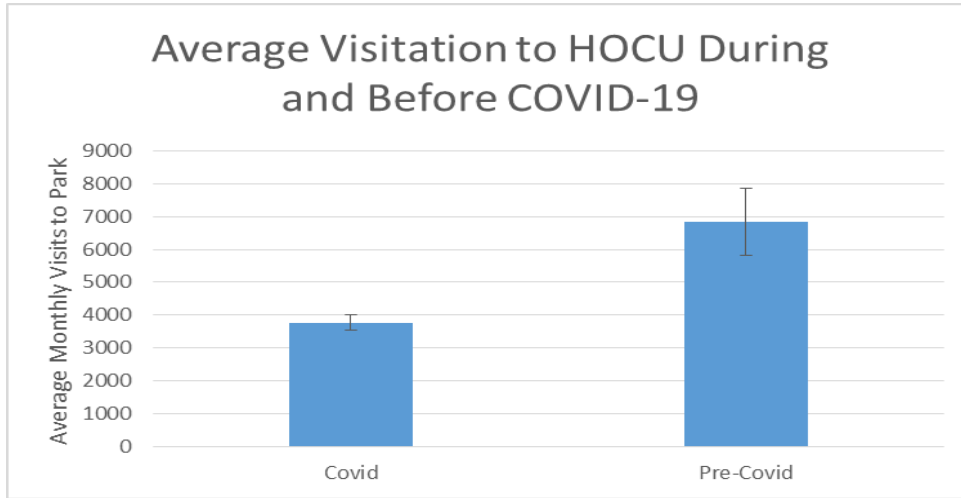
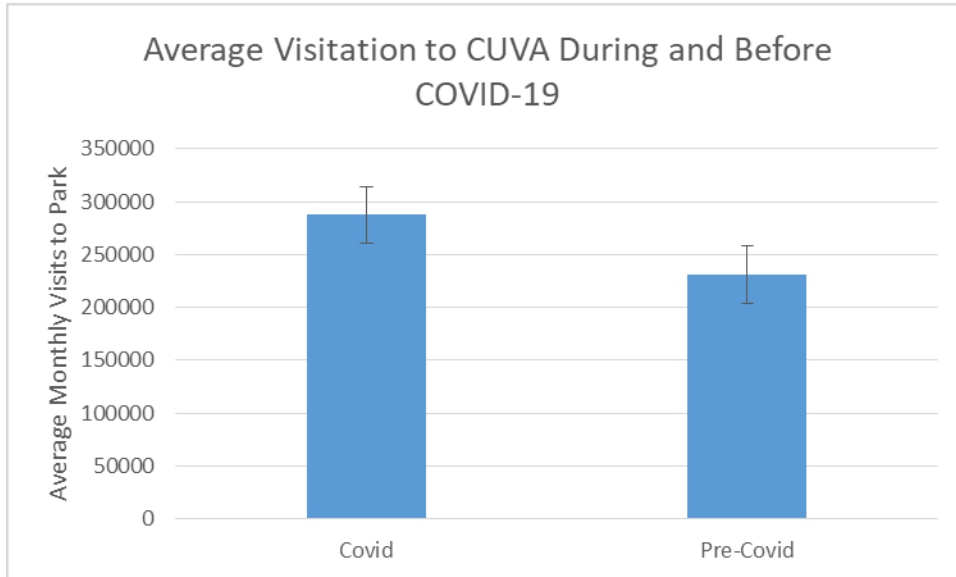


Figure 3

Average monthly visitation to Cuyahoga Valley National Park (CUVA) during and before the Covid-19 pandemic.



Of the five national parks that were designated to the enclosed spaces group, all five saw a statistically significant decrease in visitation from the start of the COVID-19 pandemic compared to the previous year. All five of the enclosed space national parks demonstrated significant visitation decreases from 2109-2020 with Charles Young Buffalo Soldiers National Monument, William Howard Taft National Historic Site, James A. Garfield National Historic Site, James A. Garfield National Historic Site, and First Ladies National Historic Site ($p < 0.01$). A visual representation of the changes in visitation during the COVID-19 versus before the COVID-19 for the enclosed space parks are represented in figures 4-8.

Figure 4

Average monthly visitation to Charles Young Buffalo Soldiers National Monument (CHYO) during and before the Covid-19 pandemic.

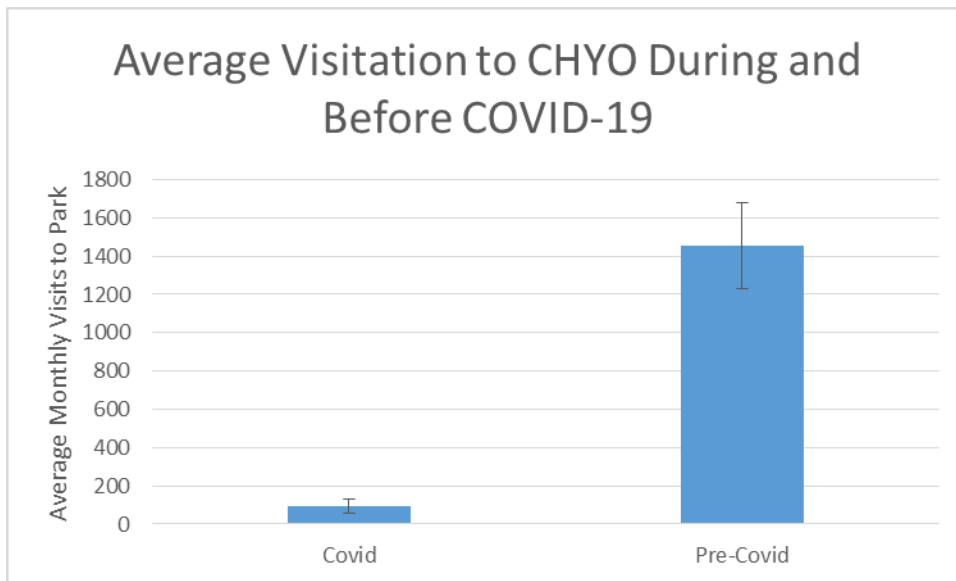


Figure 5

Average monthly visitation to William Howard Taft National Historic Site (WIHO) during and before the Covid-19 pandemic.

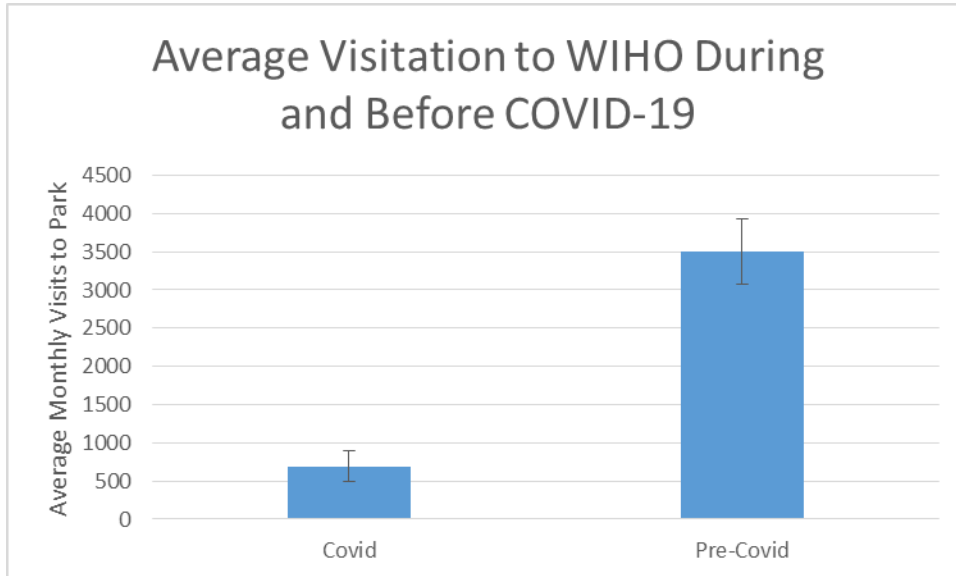


Figure 6

Average monthly visitation to James A. Garfield National Historic Site (JAGA) during and before the Covid-19 pandemic.

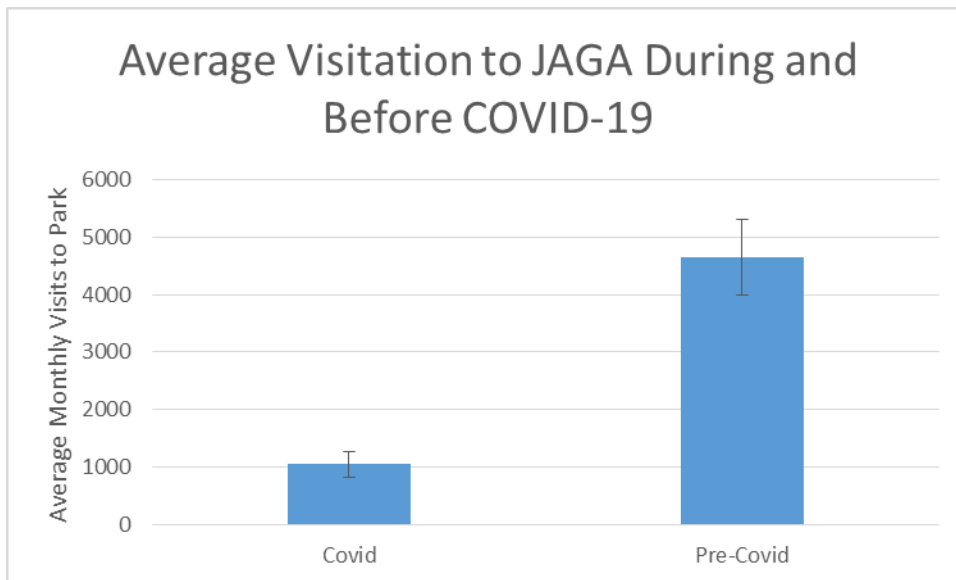


Figure 7

Average monthly visitation to Dayton Aviation Heritage National Historic Site (DAAV) during and before the Covid-19 pandemic.

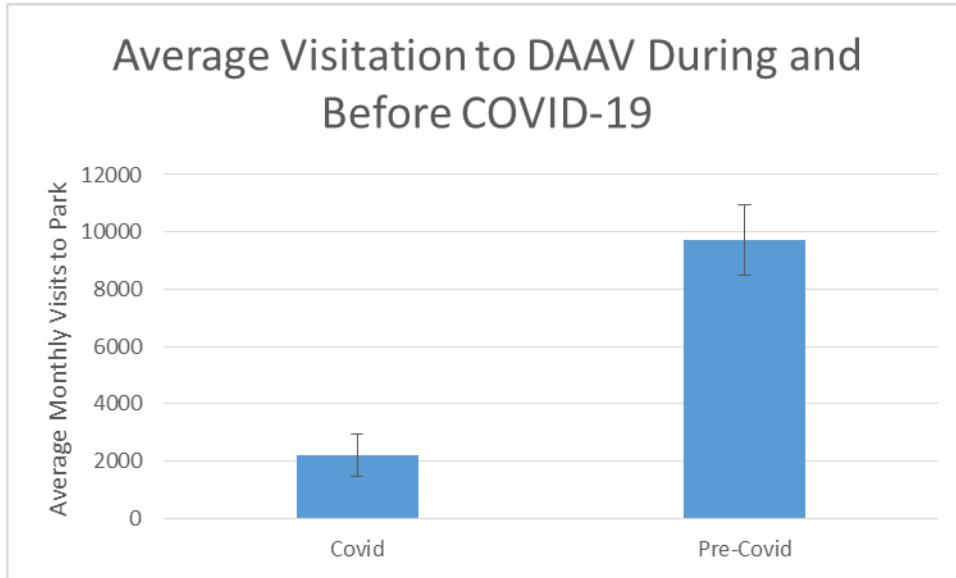
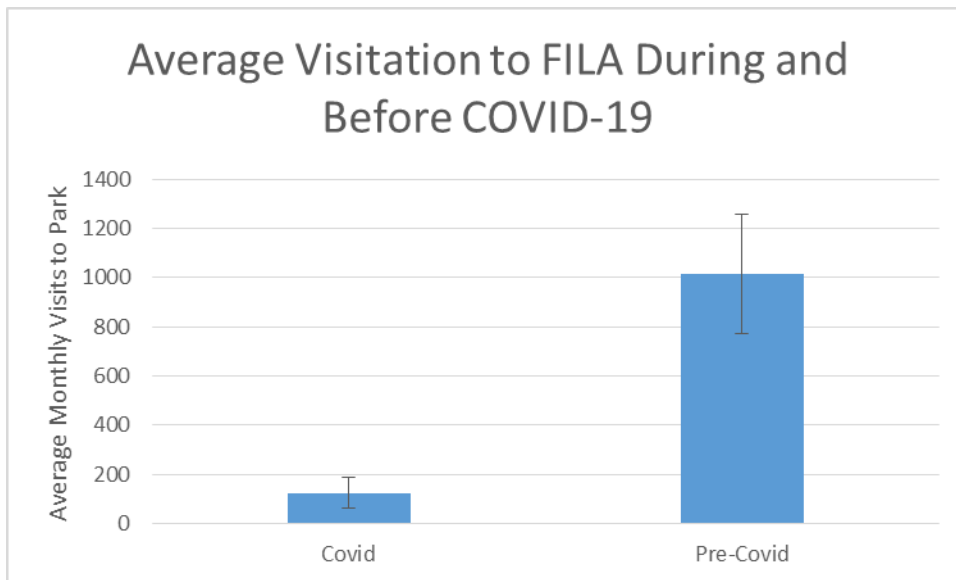


Figure 8

Average monthly visitation to First Ladies National Historic Site (FILA) during and before the Covid-19 pandemic.



To further illustrate the effects of the pandemic on park visitation, the visitation data was compared by month from pre-COVID-19 to during the pandemic to get a more in depth look at how each month's visitation changed compared to the same month from the year before.

Table 1

The percentage of visitors to each park in the year 2020 when compared to the year 2019. Red indicates a decrease in visitation while green indicates an increase in visitation.

	Park Name	CUVA	JAGA	FILA	PEVI	HOCU	CHYO	DAAV	WIHO
YTM % Change	March	51%	43%	49%	44%	27%	76%	65%	62%
	April	35%	87%	100%	7%	18%	96%	96%	96%
	May	20%	87%	100%	81%	41%	98%	97%	97%
	June	14%	88%	99%	67%	48%	97%	83%	81%
	July	21%	73%	80%	77%	52%	93%	64%	77%
	August	24%	68%	75%	78%	57%	96%	41%	68%

CUVA = Cuyahoga Valley National Park, JAGA = James A. Garfield National Historic Site, FILA = First Ladies National Historic Site, PEVI = Perry’s Victoria and International Peace Memorial, HOCU = Hopewell Culture National Historic Park, CHYO = Charles Young Buffalo Soldiers National Monument, DAAV = Dayton Aviation Heritage National Historic Site, WIHO = William Howard Taft National Historic Site (National Parks Service, 2021)

As seen in table 1, when visitation increases occurred, the largest increases were seen in March when the lockdowns began and in the following month of April when lockdowns were still new. Even though Hopewell Culture and Historical Park did not see increases in visitation, it should be noted that during the initial two months of the lockdown the percentage of decreases compared to the previous years were the lowest out of the time that the study looked into. Of all the parks that were part of this study, only the First Ladies National Historic Site was the only one that closed during the pandemic.

Discussion

With the ongoing COVID-19 pandemic, Ohio’s national parks have seen major changes in their visitation. The majority of national parks have had significant decreases in visitation, but the reasons for their decreases can be either good or bad depending on how one interprets them.

First, there has been a major push during the COVID-19 pandemic to limit social gatherings to small groups and to discourage the amount of interaction that people have with those outside of their households. This could be one reason that there has been such a massive decrease in visitation when it comes to parks that are more educationally based around a historical site or are indoors. These parks are often not very large, which results in a decreased ability to socially distance and without open space this reduces the amount of people able to visit the parks every day. While this is not good for the parks total visitation numbers, the fact that fewer people have been visiting these parks is advantageous in combating the COVID-19 pandemic. On the contrary, there could be a push for drawing larger crowds or allowing more people to enter these parks. These indoor parks are often located in medium to large size cities like Canton and Dayton whose residents are often accustomed to large amounts of social interaction due to the urban environments. During times of social isolation or quarantines it has been found that mental illnesses such as depression, stress, emotional fatigue, and insomnia will increase among many in urban areas (Xie, Luo, Furuya, & Sun, 2020). So while these parks are not necessarily regarded as green spaces, they could still have a positive effect on the mental wellbeing of those who can visit them. On top of this, it may be beneficial for these parks to increase the amount of outdoor space that is available for use to those who visit them in order to improve health benefits along with their educational purposes. In these urban areas, it was reported that by visiting a park many people felt that their physical health improved, their need for social interaction was satisfied, and that their mental health was satisfactory (Xie et al., 2020). Another improvement that could be made to boost visitation and effectiveness of the parks with low visitation could come from landscaping of the parks. It has been found that the addition of flowers has shown to be important in the moods of women while having open green space and trees is more beneficial to

men (Pazhouhanfar, 2018). Because public health and safety is such an important aspect of society, especially during a pandemic, finding the balance between keeping the pandemic under control and keeping people physically and mentally healthy will be hard but the parks system is a good place to start.

Cuyahoga Valley National Park (CVNP) is an interesting case in this study. CVNP has an area of nearly 33,000 acres which contains over 125 miles of hiking trails. CVNP also provides trails for mountain biking as well as trails that connect to the Ohio Towpath which stretches over 80 miles. This national park was the only park that saw continued visitation numbers above the previous years, but also being the only park that did not show evidence that the COVID-19 pandemic had a significant impact on visitation is interesting. Originally, it would have been thought that because of the closure of different recreational facilities, restaurants, etc., as well as people being confined to their homes, that Ohio's largest national park would have shown statistically significant changes in visitation. The positioning of the park in northeast Ohio is also important to the park as it is located in a heavily populated area of the state. This would suggest that this large population surrounding the park, as well as the park's massive size would have drawn more people to it for its numerous trails and substantial amount of space that could decrease the amount of human interaction. There are possible answers as to why this park did not see as much of a spike in visitation as expected though. One reason that this park may not have seen significant increases is the fact that it had any increases at all. It was found that throughout the pandemic, areas with high caseloads or populations were often avoided by outsiders and travel within the area was limited (Brinkman & Mangum, 2020). This could have turned one of the park's advantages into a disadvantage. With public health officials being adamant that human to human contact be minimized as much as possible, crowded park roads, parking lots, and

trailheads could have deterred a large number of visitors who were planning on spending time at the park (Freeman & Eykelbosh, 2020). This fear, while justified, could be a large contributor to the fact that this park did not see statistically significant gains. Another important factor that could be curtailing the amount of people that would potentially visit the park is the median age of the residents in the surrounding area. Median age has been found to correlate with park visitation. As median age in residents surrounding a park increases, the amount of park visitations decreases (Rice & Pan, 2020). As COVID-10 research shows, the older population and those with underlying conditions are the most vulnerable. Further investigation of area residents who visit CVNP and the average age of the areas surrounding the park may be able to explain this further. Another possible reason why visitation did not increase could be the fact that recreational activities in the park were no longer provided. These cancellations include all activities including those for both boy and girl scouts, children programs, and the closure of popular destinations like the Brandywine Falls boardwalk. Even without these recreational activities, Cuyahoga Valley National Park saw minimal increases of 14%. It could be surmised that if these recreational activities were still operational, the increases may have been even larger. Another interesting finding in regards to the visitation statistics of Cuyahoga Valley National Park is the timing of the different increases. Another possible reason that increases did not occur as expected, could be due to a lack of transport or safety issues. With the need to be socially distanced it could be intimidating for some people to get on a possible crowded bus or to order a taxi or ride share service with strangers. The largest areas surrounding CVNP, Cleveland and Akron, also have their share of dangerous areas that often see crime which could have discouraged some possible visitors from biking or walking to the park. During the months of the statewide stay-at-home order from March to May, there was the largest amount of increases from

51% in March, 35% in April, and 20% in May, even though at this time, the weather in northeast Ohio can be unpredictable and still relatively cold. According to the National Weather Service (2021), the Cleveland area had an average temperature in March of 44.2°F, April had an average temperature of 46.7°F, and May had an average temperature of 57.9°F. This is also interesting considering the percent increases decreased as the weather improved over the three month time span that the stay at home order was in effect. There have been findings that as latitude increases so does park visitation but the overall understanding behind this trend is still being questioned (Rice & Pan, 2020). This could be attributed to those who live in more northern areas being more equipped to go out in cold weather. Finally, as stay-at-home orders were lifted throughout the United States and travel became more acceptable, many people may have gone to out of state parks, beaches, or mountains instead of staying closer to home and visiting CVNP.

One possible reason that the largest increases occurred during these first few months could be that of a psychological explanation. With businesses being closed and contact being limited, many people could have been using these green spaces as a way to cope with the changes in their daily lives. As stated in previous studies, green spaces allow for safer social interactions in a time where many are facing psychological distress at home. Adults are facing difficulties with stress, anxiety, depression which can be helped with visiting parks along with physical improvements that can help combat COVID-19. Mental distress is not the only reason for adults to be visiting green spaces such as this park alone though. It has been found that physical activity has been shown to reduce the risk of acute respiratory distress syndrome, currently the leading cause of death in those who are infected with COVID-19 (Nyenhuis, Greiwe, Zeiger, Nanda, & Cooke, 2020). Not only does exercise reduce the risks associated with COVID-19, but overall it reduces the risks of many comorbidities that along with COVID-19 can

drastically affect the disease. By increasing physical activity and by doing so in an open area such as this park, people may be meeting physical activity requirements while also creating a safeguard against the pandemic as long as social distancing and health guidelines are followed.

Children are also facing many difficulties due to the COVID-19 pandemic that parks such as Cuyahoga Valley National Park can help alleviate. With the closure of schools and daycares children were forced to spend more time than usual at home which in turn could increase the likelihood of family conflict, domestic violence, and child abuse (Razani et al., 2020). Children are also facing a hard time being physically active during the pandemic. It has been reported that there has been a large increase in sedentary behavior among children as schools have closed and leisure time within the home has increased (Dunton, Do, & Wang, 2020). Without structured events during the early days of the pandemic, many parents may have used the national parks in order to keep their children physically active or mentally engaged as opposed to allowing them to spend more time on a screen. This is also coupled with the fact that many municipalities limited the available equipment at local parks by removing sports equipment or roping off playgrounds.

Another reason for a less drastic increase in visitation in the park could be a reduction in the number of older adults that are visiting. According to the Center for Disease Control and Prevention, older adults are at the most risk for hospitalization and death when it comes to COVID-19 and people who are 65 or older currently account for 80% of the deaths in the United States (CDC, 2021). Because COVID-19 is such a serious concern for older adults, many may believe that it would be safer to forgo their visit all together. Recommendations have also been made that virtual tours of the parks are much safer for older adults rather than visiting the park in person (Budd, 2020). It may be advantageous for this population to stay close to or at home, but

physical activity should also be an important part of older adults' lives in order to stay healthy and outdoor activity at a park would be a safer option than others. According to Slater et al. (2020), stay-at-home orders can significantly impact the ability of those in the vulnerable populations to get exercise. This highlights the importance of finding a way to safely integrate the older population back into using the parks system.

The open green space could have also given those who visited a sense of freedom that had been stripped away due to the many restrictions put in place to combat the pandemic. As the lockdowns ended, there was a quick and decently large decrease in the percentage of visitors compared to the year before. This can go back to the fact that with the summer months, more people are likely to visit the park, so more people were actually cautious of visiting the park, resulting in lower visitation than was expected. Another reason for this slowed increase in visitation is the possibility that a large number of those visiting the parks could have been doing so for exercise. With the opening of businesses in May, including fitness facilities, many people who were forced to exercise at home or in the parks could go back to exercising indoors at their preferred location. It is important to note that in previous studies it has been found that senior citizens are the least likely to visit parks but this was conducted in an urban park rather than a national park (Cohen, Mckenzie, Sehgal, Williamson, Golinelli, & Lurie, 2011). Even though senior citizens are the least likely to visit the parks, a decrease in their visitation would most likely be noticeable.

Perry's Victory and International Peace Monument is an interesting park among those in the study. Originally, the park saw a large increase in visitation compared to the year before, but as time went on the park saw only a fraction of the visitors as the year before. While the park is not large, it is an open green space that allows room for activities which seems that it was taken

advantage of in March. One possible reason that the park quickly started to lose visitors is the fact that it is located on South Bass Island in Lake Erie. In a previous study, one predictor of park usage was the proximity of a person to a park with over a third of the subjects reporting they infrequently used the park if it were more than a mile away (Cohen et al., 2011). With the park being located on an island this would most likely exacerbate the decline in visitation which was seen after the two initial months. The explanation as to why the park initially increased in visitation would need to be investigated further. With travel options to the island being either a ferry, private boat, or chartering a flight, this could make reaching the park extremely difficult especially as the seriousness of social distancing and reduced human contact became more apparent. It has been reported that overall travel has decreased, especially cross county visitation (Brinkman & Mangum, 2020). Not to mention that the ferries would have to reduce occupancy to safely commute people to the island and the availability of private charters either by boat or plane could be costly and cramped.

Another possible reason for the large reductions in visitation to Perry's Victory and International Peace Monument could be due to the surrounding community of Put-in-Bay. The communities that are surrounding national parks are often referred to as "gateway communities" and can play a large role in park visitation (Budd, 2020). These communities are often economically tied to the national parks due to visitors spending. With the closure of businesses and the restriction on travel, the amount of possible visitors to the island would likely decrease which was seen in the data after the month of April.

One of the more interesting sets of data comes from the Hopewell Culture National Historical Park. This park offers open green space as well as different trails but consistently saw lower visitation numbers throughout the entire time period of the study. One of the reasons for

this could be that the park is located in south central Ohio, south of Columbus, which is less populated. Because of the distance needed to travel to this park, many may have preferred to either exercise at their local parks or homes. The park is also on the smaller size as its trails are all shorter than three miles which could dissuade those from making the trip to it. It has been found that park visitation can be attributed to a multitude of different factors such as camping opportunities, water related activities, and the facilities that are offered to those who visit the park (Mills & Westover, 1987). Because Hopewell Culture National Historical Park does not offer many of these attractions that could be a possible reason that it saw a decrease in visitation even though it is an open green space. Much like Cuyahoga Valley National Park, there was a larger decrease in visitation during the months after the lock down ended, suggesting that people were returning to their original forms of recreation or exercise compared to visiting the park. When looking at the dataset as a whole there are discrepancies with other studies done on national park visitation.

With this study, there are improvements that can be made in future studies to further understand the connections between the COVID-19 pandemic or other pandemics and the effect it has on the national parks system. First, further data collection on parks outside of Ohio could show different findings depending on how the study is run. It is important to keep in mind that when traveling out of state, many states required a two week quarantine once entering the state which could prohibit many people from visiting the parks. Had this requirement not been in place, there is a likelihood that some parks could have seen a larger increase in visitation and others could have seen smaller decreases in visitation. The nature of the COVID-19 also can affect the visitation numbers. Had this pandemic not been a respiratory disease, the changes in numbers could have been vastly different as well. Another factor that could further help with

understanding why people were reluctant to visit or were visiting national parks, would be to also investigate state and local park visitation data as well. With the addition of Ohio's 75 state parks as well as the many local parks a more complete analysis of how people are utilizing the different levels or parks can be compiled. Along with this data, conducting a post or pre-visit survey for each unique visitor can allow researchers to understand why the parks are being visited. This data can allow researchers to better understand the most important aspects of the park as well as how these aspects can be improved in the case of future pandemics. Another important factor that could add to future studies is the addition of psychological data of those who visit the parks. This can help researchers build a better understanding of the mental effects that the parks also provide as well as build on past studies that have investigated this. Finally, being more selective on park selection could improve overall understanding of the subject. Because national parks can include historical sites such as former presidential residences and important battle sites, looking at the national parks as a whole may be counterproductive in the studies.

In conclusion, the national park visitation statistics have allowed a more in depth view of how the people of Ohio and those who visit Ohio's national parks have responded to the pandemic. Of all the parks in Ohio, Cuyahoga Valley National Park was the only park to see consistent increases in visitation during the pandemic compared to the previous year. This allows us to infer that more people are taking advantage of outdoor green spaces to help them through the social isolation of the COVID-19 pandemic. Also, with the reduction in visitation at parks that do not offer large amounts of open green space assumptions can be made that public health warnings about limiting time spent in enclosed spaces and within close proximity of others are being followed to some extent.

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