Florida's Public Libraries: Major Events Longitudinal Study

Prepared by the University of Florida
Bureau of Economic and Business Research (BEBR)[1]

December 1, 2021

Executive Summary

Across the state of Florida, public libraries provide a wide range of valuable services and resources that support educational, recreational, and business needs. Libraries are an important resource for internet access, training programs, e-government services, educational materials, access to health information, and assistance to unemployed individuals seeking employment, among others. These services and resources provide significant benefits to library patrons and their communities, particularly in times of natural disasters and economic downturns.

As commissioned by the Florida Department of State Division of Library and Information Services (DLIS), this report examines how major events, such as hurricanes, wildfires, and economic downturns, are related to the use of public library services in Florida over the past 20 years. In particular, we quantify the impact of these major events on library visits, program offerings and attendance, reference transactions, and use of electronic resources.

Our main findings are illustrative. First, library visits increase during natural disasters. In particular, during large wildfires, libraries see an increase of 9% in visits. Second, the number of library programs increases as well, especially during hurricanes, with estimates showing increments ranging between 8% and 18% depending on the region considered affected by the storm. Importantly, this increase in library programs is closely matched by an increase in program attendance, particularly among adults. Third, public libraries also see a rise, particularly during hurricanes, between 15% and 18% in traditional reference transactions. Finally, our results indicate that library use remains relatively unchanged across the economic cycle.

Overall, our results provide empirical evidence that library use increases during natural disasters and highlight the vital role that Florida public libraries play in communities across the state, particularly in areas affected by natural disasters.

1. Introduction

United States public libraries provide a wide range of valuable services and resources that support educational, recreational, and business needs. For instance, libraries are an important resource for internet access, training programs, e-government services, educational materials, access to health information, and assistance to unemployed individuals seeking employment, among others.

Access to the Internet is among the more important services that public libraries offer for a variety of reasons including access to job opportunities, educational resources, e-government services, emergency information, as well as other activities (Bertot et al., 2008). Additionally, libraries offer programs such as digital literacy (Bertot et al., 2008) and training programs to assist unemployed individuals in creating resumes and using online resources to search for jobs (Philbin et al., 2019). Library programs also offer certifications in specific fields and occupations and help those who are unable to afford these services from more traditional sources. Furthermore, libraries assist patrons in obtaining government forms (Becker et al., 2010) and assist them in understanding and using electronic government websites, including filling out the necessary forms to apply for unemployment benefits (Young, 2018). Libraries also serve as a valuable resource for education thanks to their large collections of books and access to computers and computer programs. Libraries additionally facilitate access to healthcare by offering direct healthcare services, health information, and linkage to services (Philbin et al., 2019). As a whole, the resources made available by public libraries provide significant benefits to their communities, and in times of natural disasters and economic downturns, these services and resources can play an increasingly important role.

During natural disasters, libraries participate actively in the recovery process by providing important services to their communities. O'Connell (2005), for example, describes how libraries in several Florida counties set up daycare programs to fill in for schools that had been closed due to the four hurricanes that hit the state in 2004. She also noticed that libraries served as emergency centers to coordinate relief efforts, allowing residents to contact relatives, insurance companies, and federal agencies such as the Federal Emergency Management Agency (FEMA). As a result, libraries saw a dramatic rise in visitors and computer usage. Moreover, Jaeger et al. (2007) found that in the aftermath of the 2004 and 2005 hurricane crisis in the Gulf Coast, public libraries played several key roles from distributing food to providing shelter, while ensuring access to vital information continued to be a critical service to their communities. Similarly, when hurricane Sandy hit the East Coast in 2013, Flaherty (2016) describes public libraries in the region as vital community centers, providing internet access, assistance with forms and with registering for relief aid, as well as financial planning seminars, among other services. These examples highlight the important role that public libraries can play in areas affected by natural disasters as well as how important they can be in the recovery process.

As commissioned by the Florida Department of State Division of Library and Information Services (DLIS), in this report, we examine how major events, such as hurricanes, wildfires, and economic downturns, are related to the use of public library services in Florida over last 20 years. During the last two decades, in addition to the Great Recession between 2008 and 2009, 21 hurricanes hit Florida and several counties experienced large wildfires (more than 5,000 acres burned) as well. In particular, we quantify the impact of these major events on library visits, program offerings and attendance, reference transactions, and use of electronic resources. For this analysis, we constructed a longitudinal dataset covering the period 2001-

2020 linking information about Florida's public libraries with the occurrence of hurricanes and wildfires in Florida, as well as the unemployment rate in Florida counties.

Our results show that public libraries experience an increase in library visits during natural disasters, particularly during large wildfires. There is also an increase in library programs, which is closely matched by an increase in program attendance, particularly among adults. In addition, libraries see a rise in traditional reference transactions, particularly during hurricanes. Overall, our findings provide evidence that library use increases during natural disasters and highlight the vital role that Florida public libraries play in the communities as these resources are used in times of major events.

The remainder of this report elaborates and summarizes our work on this project. Section 2 sets the context and presents an aggregate overview of Florida public libraries over the last 20 years. Section 3 describes our data sources and provides summary statistics. Section 4 presents our empirical methodology for quantifying the relationship between major events and changes in the use of library services and summarizes our main findings. Section 5 concludes.

2. Florida Public Libraries

Through its more than 550 outlets across the state of Florida, Florida public libraries provide valuable services and resources that serve a variety of community needs. In this section we present an aggregate overview of the public libraries in Florida. In particular, we examine the overall trends in operating expenditures, the population served, and library resources, services, and usage over the period 2000 to 2020.

As shown in panel A of figure 1, Florida's population has grown steadily every year from 16 million in 2000 to 21.6 million in 2020, an increase of 35% over the past 20 years. Over the same period, the number of library registered users went up from 7.6 million to 11.4 million (i.e., from 47.5% to 52.8% of the population). These increases in the population served and in the number of registered users have been met with increases in the libraries total operating expenditures. Illustrated in panel B of figure 1, the total operating expenditures (in 2020 inflation-adjusted dollars) were $478.8 million in 2000 and reached a peak of $703.7 million in 2009. Notably, since 2012 operating expenditures have been trending upward, and as a result, the operating expenditures per person have remained relatively stable since then.

Figure 1. Population Served and Operating Expenditures
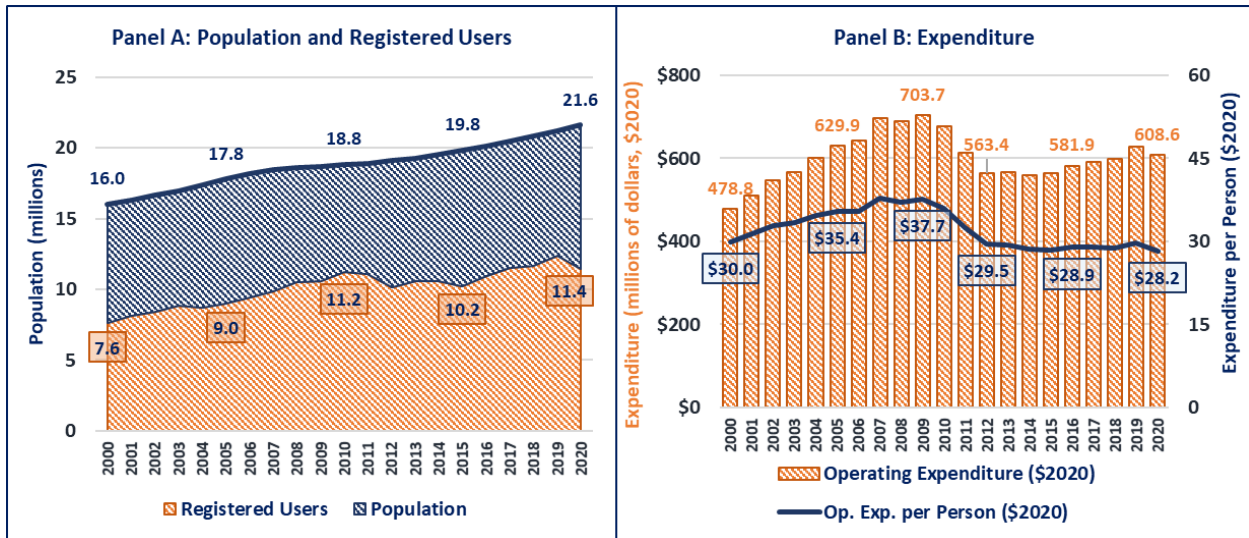
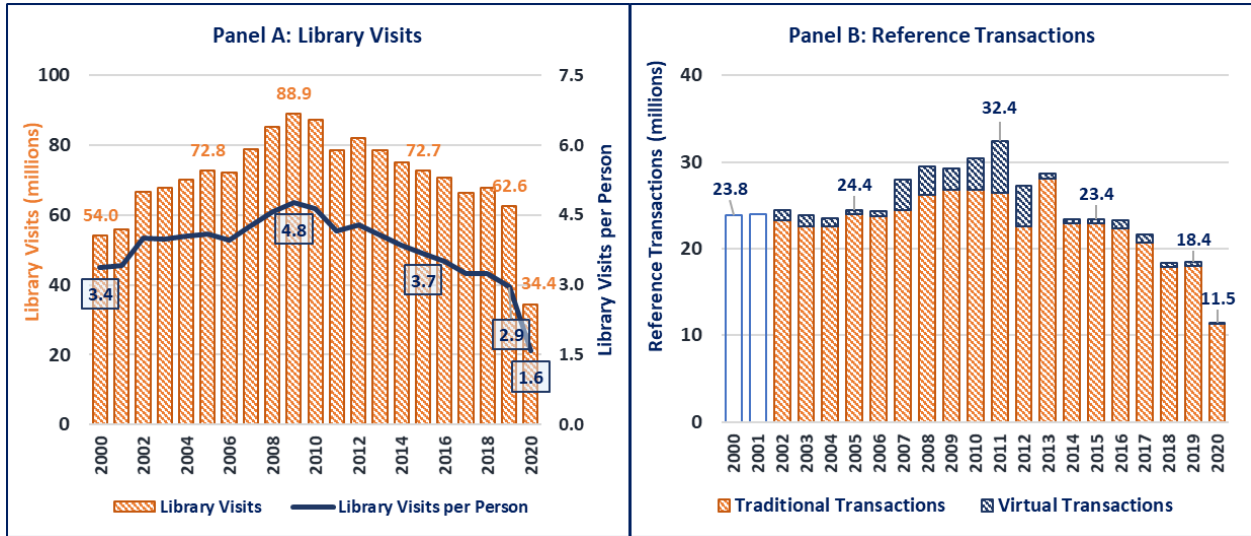**Panel A: Population and Registered Users**

Panel B: Expenditure

Source: data is supplied to the Division of Library and Information Services (DLIS) by public libraries (Annual Statistical Report). Population figures come from University of Florida Bureau of Economics and Business Research. Per person means per person in the population.

In terms of library visits, as shown in panel A of figure 2, the total number of persons entering the libraries annually has decreased over the last ten years, down from a high in 2009 of 88.9 million visits to 62.6 million in 2019. Notably, the number of visits dropped sharply in 2020 to a total of 34.4 million, a 45% decline with respect to the previous year. This sharp decline is largely attributed to the coronavirus pandemic, which upended library services and the lives of Floridians. A similar pattern is observed in the annual number of reference transactions in panel B. This panel shows the number of transactions broken down into traditional and virtual (internet) transactions.[2] On average, over the last 20 years, around 7% of the total annual transactions are using the Internet.

While library visits and reference transactions have been declining slowly since around 2010, the total number of on- and off-site programs offered by the libraries has increased strongly over the years. These programs introduce the attendees to the wide range of library services available and provide cultural, recreational, or educational information. As shown in panel A of figure 3, between 2000 and 2019, the number of programs per 1,000 people (in the population) doubled, from 6.5 programs per 1,000 people to 13 programs per 1,000 people. Similarly, the number of persons attending the programs increased. In particular, attendance per 1,000 people went from 188 to 270.2 in the same period. Unsurprisingly, the number of programs offered as well as the number of persons attending dropped sharply in 2020 as a result of the pandemic.

---

[2] Reference transactions are information consultations in which library staff recommend, interpret, evaluate and/or use information resources to help others to meet information needs. Traditional transactions occur in person or over the phone while virtual transactions correspond to questions received electronically and responded to electronically (e.g. by email, chat, etc.).

Figure 2. Library Visits and Reference Transactions

Panel A: Library Visits

Panel B: Reference Transactions

Source: data is supplied to the Division of Library and Information Services (DLIS) by public libraries (Annual Statistical Report). Per Person means per person in the population. For 2000 and 2001, the data only shows total reference transactions, not broken out by traditional and virtual.

Finally, in terms of the electronic resources, Figure 3 panel B shows the number of Internet computers accessible by the general public has also increased steadily from nearly 5 thousand computers in 2000 to more than 17 thousand in 2020. In contrast, as shown in the same figure, the number of uses (sessions) of the library's public Internet computers per person (in the population) peaked in 2009 at 1.2 sessions per person and has decreased to 0.6 in 2019 and 0.3 in 2020.

Figure 3. Library Programs, Public Computers, and Electronic Users
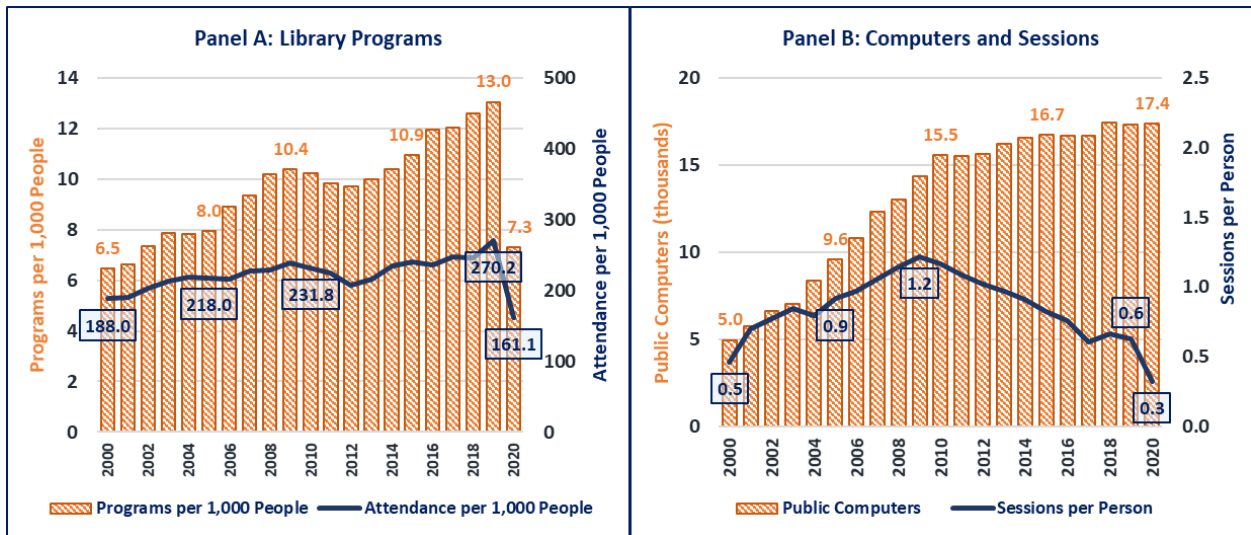
Panel A: Library Programs

Panel B: Computers and Sessions

Source: data is supplied to the Division of Library and Information Services (DLIS) by public libraries (Annual Statistical Report).

3. Data Sources and Summary Statistics

To conduct the analysis, we construct a longitudinal dataset containing information about Florida's public libraries and the occurrence of hurricanes and large wildfires in Florida, as well as the unemployment rate. Each piece of information comes from a separate source. To construct the final dataset for the analysis in the next section, we linked all the data using the variable county as the common field across all four sources. Below we detail the sources and describe the steps followed to process the data.

3.1. Florida public libraries data

The libraries data is provided by DLIS after being supplied by the public libraries across Florida through the Annual Statistical Report Form.[3] This data contains yearly information about library resources, services, and usage such as library visits, circulation, collection size, programs, electronic resources, staffing, operating revenues and expenditures, among other data. To study how major events are related to library service use we focus on the impacts on library visits, programs offered and program attendance, number of reference transactions, and access to electronic resources, which are available consistently over the period 2001 to 2020.[4]
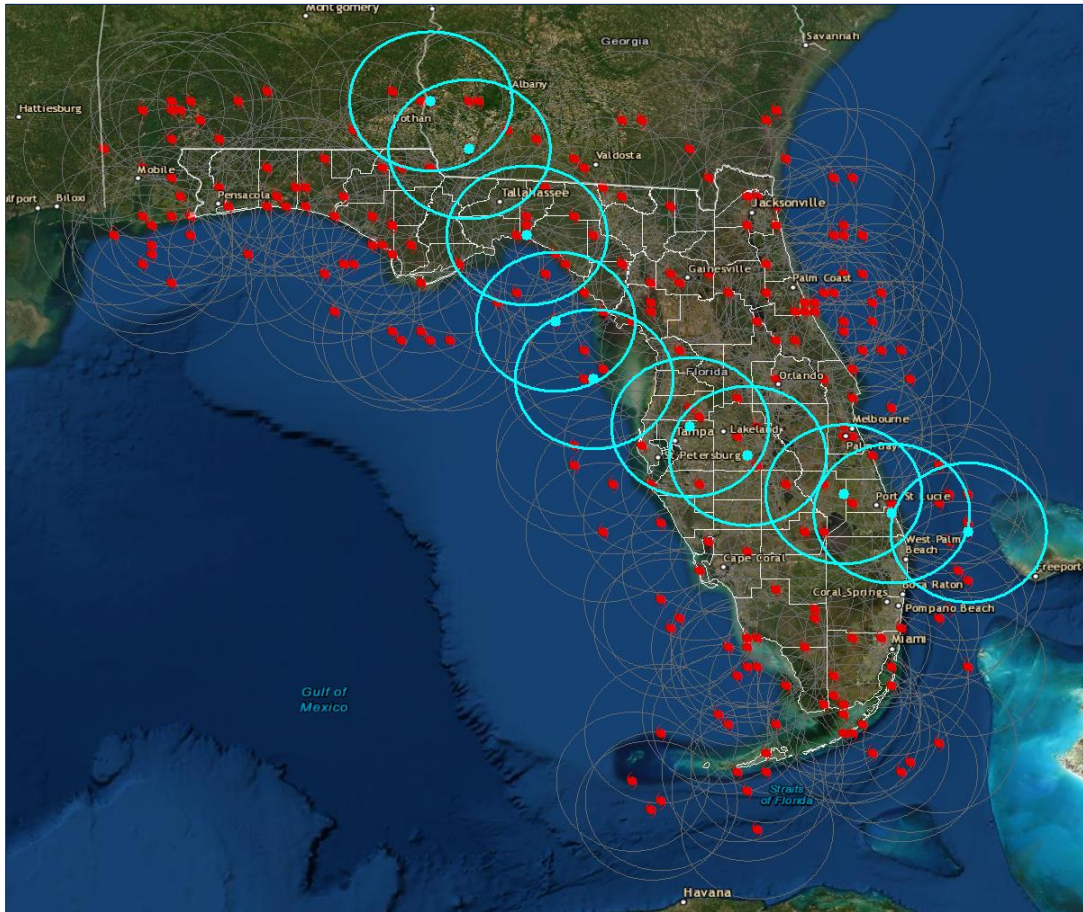
3.2. Hurricane data

Hurricane data comes from the Atlantic hurricane database (HURDAT2) 1851-2020 created by the National Oceanic and Atmospheric Administration (NOAA).[5] This dataset contains the six-hourly information on the location (geographic coordinates) and characteristics of all known tropical cyclones and subtropical cyclones in the Atlantic. Using this information, we geocode the track of all the storms crossing Florida between 2000 and 2020 and build a separate dataset. We use this separate dataset to identify the counties affected by the storms each year. Included in this dataset, we additionally construct 25- and 50-mile buffers around each geocoded point to identify neighboring counties that are also affected by the storms. Figure 1 shows a map with each of the six-hourly track points in our dataset as well as the 50-mile buffer constructed around each point. The blue circles on the map, highlight the path of hurricane Frances, which was the second most intense tropical cyclone during 2004.

---

[3] The annual public library statistics tables are available here: https://dos.myflorida.com/library-archives/library-development/data/
[4] Electronic resources are available since 2002.
[5] This database is available here: https://www.nhc.noaa.gov/data/.

Figure 4. Track Path of Tropical Cyclones in Florida, 2000-2020

The map shows six-hourly track points of tropical cyclones affecting Florida and highlights the path of hurricane Frances (2004) along with its 50-mile buffer. The points are based on the Atlantic Hurricane database from NOAA.

Over the last two decades, the state of Florida has been hit by 52 tropical cyclones. Table 1 contains the list of tropical cyclones and their categories, both the overall maximum and the maximum when in Florida. While most of them were classified as tropical storms or tropical depressions at their overall maximum strength, seven were category 1 hurricanes, two were category 2, one was category 3, four were category 4, and seven were category 5 at their strongest. When hitting Florida, some storms' strength was lower than the storms' overall strength. It is worth mentioning some of the patterns observed. First, on average, 2.5 storms hit Florida in any given year between 2000 and 2020. Second, the year with the most storms was 2005 with 6, including two category 2 hurricanes, one category 3 and one category 4 when affecting the state. Third, although the Atlantic saw some activity in the years 2011, 2014, and 2015, no storm hit Florida directly. Fourth, interestingly, the only tropical cyclone that was a category 5 hurricane at its height when affecting Florida was hurricane Michael in the fall of 2018, while the storms Charley (2004), Dennis (2005), Matthew (2016), and Irma (2017) were the only category 4 hurricanes when they hit the state. Finally, the data shows that not all 67 Florida counties are affected by the same hurricane in any given year, even when considering our 50-mile buffer. The map in Figure 5 panel A shows that all Florida counties have been in the path of at least one hurricane (category 1-5) between 2000 and 2020. In particular, 12 counties were only hit once while 8 counties were hit four times. The map in panel B shows the same information but considering only major hurricanes (categories 3-5).

Table 1. List of Tropical Cyclones Reaching Florida, 2000-2020

Year	Tropical Cyclones (category)					
2000	Gordon (1) (FL 1)	Helene (TS)	Leslie (TS)			
2001	Allison (TS)	Barry (TS)	Gabrialle (1) (FL TS)			
2002	Edouard (TS)	Hanna (TS)	Kyle (1) (FL TS)			
2003	Unnamed (TD)	Henri (TS)				
2004	Bonnie (TS)	Charlie (4) (FL 4)	Frances (4) (FL 2)	Ivan (5) (FL 3)	Jeanne (3) (FL 3)	
2005	Arlene (TS)	Dennis (4) (FL 4)	Katrina (5) (FL 2)	Rita (5) (FL 2)	Tammy (TS)	Wilma (5) (FL 3)
2006	Alberto (TS)	Ernesto (1) (FL TS)				
2007	Barry (TS)	Ten (TD)				
2008	Fay (TS)					
2009	Claudette (TS)	Ida (2) (FL TS)				
2010	Bonnie (TS)	Five (TD)				
2011						
2012	Beryl (TS)	Debby (TS)	Isaac (1) (FL TS)			
2013	Andrea (TS)	Dorian (TS)				
2014						
2015						
2016	Colin (TS)	Hermine (1) (FL 1)	Julia (TS)	Matthew (5) (FL 4)		
2017	Emily (TS)	Irma (5) (FL 4)				
2018	Alberto (TS)	Gordon (TS)	Michael (5) (FL 5)			
2019	Three (TD)	Nestor (TS)				
2020	Fay (TS)	Isaias (1) (FL TS)	Omar (TS)	Sally (2) (FL 2)	Eta (4) (FL TS)	

The table lists all the tropical cyclones affecting Florida between 2000 and 2020. The first number in parentheses corresponds to the highest category reached by the storm. The second parentheses contain the highest category reached while affecting Florida. TD and TS stand for tropical depression and tropical storm, respectively, and the shaded cells highlight the hurricanes.

Figure 5. Counties in the Path of a Hurricane and Major Hurricane, 2000-2020
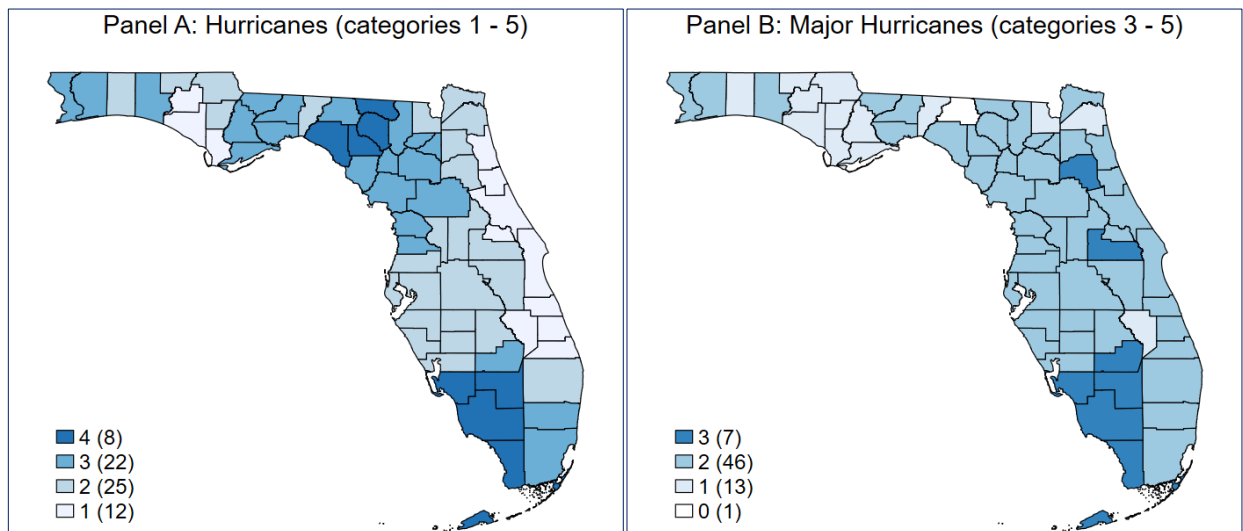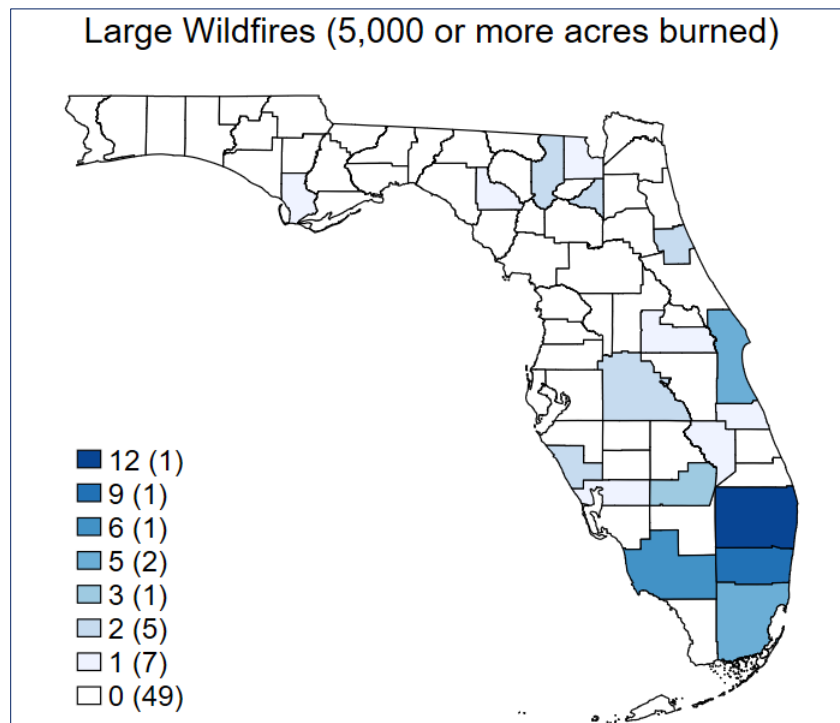

The maps show the number of years each county has been in the path of a hurricane (panel A) or a major hurricane (panel B). The numbers in the legend are the number of years, and the numbers in parentheses are the number of counties. The counts are based on the Atlantic Hurricane database from NOAA considering the 50-mile buffer around the geocoded point.

3.3. Wildfire data

Wildfires are unplanned and uncontrolled fires that burn in the wildland vegetation, typically in rural areas. The wildfire data was retrieved from the Florida Department of Agriculture and Consumer Services Florida Forest Service Reporting System.[6] This data includes the total number of wildfires and acres burned yearly by county and classifies the wildfires into seven categories (class A to G) according to its size.[7] The data is originally gathered by fire departments across the state and then uploaded to the Florida Fire and Incident Reporting System. As opposed to what occurs with the hurricanes, wildfires affect all Florida counties to some extent almost every year. Most of these fires are very small and go mostly unnoticed. Large wildfires, those burning more than 5,000 acres, are less common but more dangerous. The map in figure 6 shows that 49 out of 67 counties did not experience a large wildfire between 2000 and 2020, while the rest experienced at least one in at least one year.

Figure 6: Florida Counties Affected by Large Wildfires, 2000-2020

The map shows the number of years each county has experienced a large wildfire (more than 5,000 acres burned). The numbers in the legend are the number of years and the numbers in parentheses are the number of counties. The counts are based on the data from the Florida Department of Agriculture and Consumer Services Florida Forest Service Reporting System.

---

[6] The data is available here: http://fireinfo.fdacs.gov/fmis.publicreports/FiresByClass.aspx.
[7] Wildfires can be classified by the total acreage burned. Following the National Wildfire Coordinating Group (https://www.nwcg.gov/term/glossary/size-class-of-fire), fire size is classified in the following seven categories: Class A fires burn one-fourth acre or less; Class B burn more than one-fourth acre but less than 10 acres; Class C burn 10 or more but less than 100; Class D burn 100 or more but less than 300; Class E burn 300 or more but less than 1,000; Class F burn 1,000 or more but less than 5,000; and Class G burn 5,000 acres or more.

3.4. Unemployment data

We obtained unemployment data from the US Bureau of Labor Statistics, specifically from its Local Area Unemployment Statistics (LAUS) program.[8] This program generates employment, unemployment, and labor force statistics for a variety of geographical areas such as counties and metro areas. For this report, we retrieved labor market data at the county level for Florida between 2000 and 2020. Figure 7 shows the trend of the state's unemployment rate. The shaded region represents the range (minimum and maximum) of the unemployment rate across all 67 counties each year. As shown in the figure, like the state, counties also follow the business cycle, but experience different levels of unemployment.

Figure 7: Florida Unemployment Rate, 2000-2020
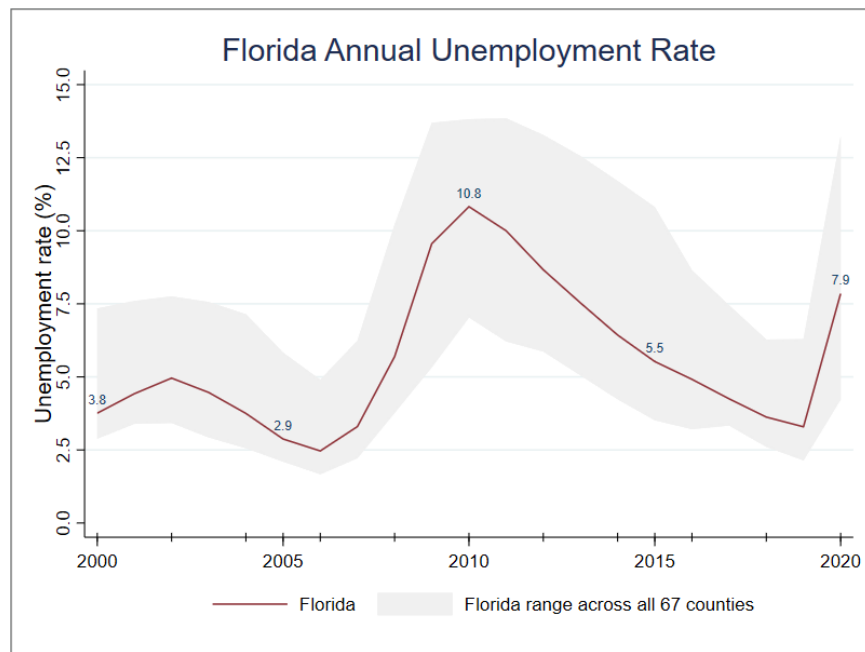
Source: U.S. Bureau of Labor Statistics.

4. Empirical Methodology and Results

4.1. Methodology

Included in our analysis is data about hurricanes, large wildfires, and the business cycle. To estimate how hurricanes and large wildfires are related to library service use such as library visits, programs offered, program attendance, the number of reference transactions, and access to electronic resources, we employ the natural occurrence of such disasters between 2001 and 2020. As noted in our data section,

---

[8] The data is available here: https://www.bls.gov/lau/.

not all 67 Florida counties see the passage of a hurricane or experience a large wildfire in any given year. Our methodology employs this variation to compare the change in library usage between years with and without a natural disaster (major event) across public libraries located in counties that experienced a natural disaster and libraries in counties that did not experience it. Our method also accounts for the differences across the public libraries on two sets of variables: variables whose values don't change for each library over time; and variables whose values change over time but have the same effect on all libraries. A potential concern with this empirical methodology is that observed or unobserved factors affecting library usage may change during a natural disaster. For instance, the hours during which the library is open or other aspects of library operations might have changed. To mitigate this issue, we control for the library's expenditures, its materials and staff, and the hours it is open each week as well as the number of computers available for public use.

Tropical depressions and tropical storms have lower intensity, and thus lower impacts, than hurricanes. For this reason, we focus on studying the impact of hurricanes (categories 1-5), as well as major hurricanes (categories 3-5). For the same reason, we consider only large wildfires, that is, those in which more than 5,000 acres have been burned. Finally, to study the effect of economic downturns on library use, we adopt the same methodology, except that instead of the presence or absence of hurricanes and large wildfires, we consider the unemployment rate in the county where the library is located as the variable capturing the major event of interest.

More technically, we use the following two-way fixed effects regression equation clustering standard errors at the county level: $\log(y_{ict}) = \mu_i + \lambda_t + \tau MajorEvent_{ct} + \boldsymbol{\theta}' \boldsymbol{X_{ict}} + \varepsilon_{ict}$, where y_{ict} corresponds to the library usage outcome in logs under study for library i located in county c at time t. μ_i and λ_t denote library and time fixed effects, respectively. The variable $MajorEvent_{ct}$ is equal to one in the year(s) when a county c experiences a hurricane or large wildfire. When the major event corresponds to an economic downturn, this variable corresponds to the unemployment rate in the county. The vector $\boldsymbol{X}$ adjusts for observable factors that also influence library use, and $\boldsymbol{\theta}'$ captures the effect of these factors. ε_{ict} is the error term. The parameter of interest is τ which captures the effect of hurricanes, large wildfires, or unemployment levels on library service use. Our results in the next subsection report estimates of this parameter.

4.2. Results

Table 2 reports our main results concerning the impact of major events on library service use. Each cell's values of the table are estimates that come from a separate regression of the dependent variable (indicated in the leftmost column) on a variable indicating the presence of a major event in the county (indicated in the rest of the columns). As mentioned previously, we geocoded the track of all the tropical cyclones crossing Florida between 2000 and 2020 to identify the counties affected by each storm and year. In addition, we constructed a 25- and a 50-mile buffer around the geocoded point since the hurricane winds are likely to affect the surrounding areas in the same way. Columns (1) through (3) contain the effect of hurricanes (categories 1-5) considering the geocoded point, 25-mile buffer, and 50-mile buffer, respectively. Similarly, columns (4) through (6) report the estimates considering only major hurricanes (categories 3-5). Column (7) reports the estimates for large wildfires, and the last column reports the

effect of unemployment rates. Each of these estimates is the percentage change in the corresponding library service.

First, we found that public libraries in Florida see an increase in library visits in years when a natural disaster occurs, particularly during large wildfires. Specifically, library visits are 9.1% higher in counties experiencing large wildfires. Increases in library visits vary between 1.4% and 6% for hurricanes, but the margin of error of our estimates is too big to allow us to draw conclusions about the effect of hurricanes on library visits with high confidence.

Second, examining the effect on library programs, we found that the number of programs increases significantly in years when a hurricane passes through. In particular, programs offered increase between 12.8% and 17.9% when considering all hurricanes, and between 8.4% and 14.5% when considering only major hurricanes. According to our results, some of these effects can be attributed to increments in adult programs. This increase in the availability of programs is closely matched by an increase in attendance at the programs, particularly among adults. For instance, in years when major hurricanes occur, program attendance increases between 7% and 12.1%. When it comes to large wildfires, even though the overall number of programs offered seems unaffected, the number of adult programs increases by 14.4% along with adult program attendance at about the same rate.

Third, in years when a hurricane occurs, libraries see a significant rise in reference transactions. Depending on the storm-affected area under consideration (geocoded point, 25-mile radius, or 50-mile radius), these increases can reach as high as 24%. Moreover, our results indicate that this effect is due in part to an increase in traditional transactions, around 15% for hurricanes and 18% for major hurricanes. In contrast, large wildfires appear to have little impact on transactions, but the margin of error of our estimates is too big to allow us to draw this conclusion with high confidence.

Fourth, in terms of access to electronic resources, our results indicate that the number of visits to the library's website (excludes visits to the library's social media accounts) is not significantly affected by natural disasters. Considering the number of sessions of the library's Internet computers, our results also show that hurricanes appear to have no significant effect, while large wildfires increase the number of sessions by 20.6%. Nonetheless, because the number of sessions reported by the libraries can be based on their estimate of a typical week rather than the actual annual number of sessions, our estimates might not fully reflect any effect on the number of sessions.

Finally, our results show that unemployment levels do not significantly affect library use. In other words, library use does not follow closely the business cycle, as discussed in the overall trends presented in section 2. Our literature review indicated that libraries provide valuable training to assist unemployed individuals in creating resumes and using online resources to find jobs as well as assisting unemployed individuals in applying for unemployment benefits. One possible explanation for the lack of increased use during times of higher unemployment is that during economic hardship, some consumers might reduce their spending and set stricter spending priorities (e.g. spending less money on library trips), which reduces the overall demand for services. Therefore, while the unemployed are more likely to use library services and benefit from them, the rest of the general population would decrease its use.

As shown in section 2, library use plummeted sharply in 2020 across all indicators due to the Coronavirus pandemic, which reshaped the world in unprecedented ways. We therefore reevaluate the impact of

major events excluding the year 2020. The results of this sensitivity analysis indicate that our main findings are robust since they remain qualitatively unchanged.

Overall, our results provide empirical evidence that library use increases during natural disasters and highlight the vital role that Florida public libraries play in communities across the state.

Table 2: Impact of Major Events on Library Usage

Dependent variable (library usage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Hurricane (category 1-5)			Major H. (category 3-5)			Large Wildfire	Unem-ployment
	Point	25 mi	50 mi	Point	25 mi	50 mi		
Library visits	0.014	0.035	0.060	0.027	0.023	0.033	0.091***	-0.001
	(0.075)	(0.041)	(0.038)	(0.088)	(0.050)	(0.044)	(0.031)	(0.020)
Programs	0.179*	0.128*	0.138**	0.145**	0.084	0.086*	0.029	-0.022
	(0.091)	(0.070)	(0.053)	(0.064)	(0.061)	(0.050)	(0.031)	(0.023)
Programs (adults)	0.170	0.222**	0.201**	0.073	0.149	0.109	0.144**	-0.035
	(0.161)	(0.106)	(0.087)	(0.127)	(0.096)	(0.088)	(0.068)	(0.032)
Program attendance	0.217*	0.120	0.070	0.121**	0.095**	0.070	-0.013	-0.028
	(0.110)	(0.077)	(0.072)	(0.059)	(0.046)	(0.042)	(0.024)	(0.023)
Program attendance (adults)	0.209	0.343***	0.230**	0.030	0.264**	0.164**	0.138*	-0.011
	(0.228)	(0.116)	(0.098)	(0.183)	(0.103)	(0.076)	(0.078)	(0.042)
Reference transactions	0.244***	0.085	-0.061	0.266***	0.033	-0.017	0.047	-0.013
	(0.064)	(0.057)	(0.083)	(0.071)	(0.062)	(0.051)	(0.044)	(0.035)
Traditional transactions	0.153**	0.076	-0.063	0.178*	0.011	-0.054	0.065	0.005
	(0.072)	(0.060)	(0.079)	(0.090)	(0.061)	(0.046)	(0.045)	(0.034)
Virtual transactions	0.309	-0.022	0.109	0.285	-0.057	0.127	-0.094	0.057
	(0.229)	(0.162)	(0.184)	(0.256)	(0.212)	(0.232)	(0.221)	(0.078)
Website visits	0.105	0.077	0.169	0.139	-0.033	0.005	-0.052	0.014
	(0.219)	(0.137)	(0.118)	(0.291)	(0.175)	(0.118)	(0.138)	(0.061)
Computer user sessions	0.080	0.030	0.076	0.107	-0.033	-0.006	0.206*	0.021
	(0.112)	(0.109)	(0.070)	(0.130)	(0.128)	(0.090)	(0.103)	(0.028)

This table reports the impact of major events on library usage (estimates of the parameter τ). The leftmost column indicates the corresponding dependent variable (log of library usage). Each coefficient comes from a separate regression. The regressions include both library and year fixed effects in addition to the control variables described in the text. Standard errors clustered at the county level are in parentheses. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

5. Conclusions

Across the state of Florida, public libraries provide a wide range of valuable services and resources that support educational, recreational, and business needs. Libraries are an important resource for internet

access, training programs, e-government services, educational materials, access to health information, and assistance to unemployed individuals seeking employment, among others. These services and resources provide significant benefits to library patrons and their communities, particularly in times of natural disasters and economic downturns.

This report examines how major events, such as hurricanes, large wildfires, and economic downturns, are related to the use of public library services in Florida over the past 20 years. In particular, we quantify the impact of these major events on library visits, programs offered and program attendance, reference transactions, and use of electronic resources.

Our main findings illustrate the service public libraries provide to Floridians. First, library visits increase during natural disasters. In particular, during large wildfires, libraries see an increase of 9% in visits. Second, the number of library programs increases as well, particularly during hurricanes, with estimates showing increments ranging between 8% and 18% depending on the region considered affected by the storm. Importantly, this increase in library programs is closely matched by an increase in program attendance, particularly among adults. Third, public libraries also see a rise, particularly during hurricanes, between 15% and 18% in traditional reference transactions. Finally, our results indicate that library use remains relatively unchanged in times of economic hardship.

Overall, our results provide empirical evidence that library use increases in Florida during natural disasters and thus highlight the vital role that Florida public libraries play in communities across the state.

References

1) Becker, S., Crandall, M. D., Fisher, K. E., Kinney, B., Landry, C., & Rocha, A. (2010). Opportunity for All: How the American Public Benefits from Internet Access at US Libraries. (IMLS-2010-RES-01). Institute of Museum and Library Services.

2) Bertot, J. C., McClure, C. R., & Jaeger, P. T. (2008). The impacts of free public Internet access on public library patrons and communities. *The Library Quarterly*, 78(3), 285-301.

3) Flaherty, M. G. (2016). Here, there, and everywhere: Disasters and public libraries. Retrieved from http://library.ifla.org/id/eprint/1375/

4) Jaeger, P. T., Langa, L. A., McClure, C. R., & Bertot, J. C. (2007). The 2004 and 2005 Gulf Coast hurricanes: Evolving roles and lessons learned for public libraries in disaster preparedness and community services. *Public Library Quarterly*, 25(3-4), 199-214.

5) O'Connell, H. (2005). Weathering the storms: Hurricanes impact Florida libraries. Florida Libraries, 47(1), 4-5.

6) Philbin, M. M., Parker, C. M., Flaherty, M. G., & Hirsch, J. S. (2019). Public libraries: A community-level resource to advance population health. *Journal of Community Health*, 44(1), 192-199.

7) Young, E. (2018). The role of public libraries in disasters. *New Visions for Public Affairs*, 10, 31-38.