

THE EFFECTS OF COVID-19 AT LAKE CARL BLACKWELL

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August 2019

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements of
the Degree of
MASTER OF SCIENCE
July, 2022

THE EFFECTS OF COVID-19 AT LAKE CARL BLACKWELL

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ACKNOWLEDEMENTS: I would like to thank Dr. Lindenmeier and Dr. Brenner for their guidance, patience, and encouragement. Their help was paramount in aiding me though writing this thesis. I would also like thank the ungodly amount of caffeinated beverages consumed during this process. Their sacrifice will be remembered. And finally, I would also like to thank all my friends and family that stood by me.

Name: MICHAEL BRUNS

Date of Degree: AUG 2022

Title of Study: THE EFFECTS OF COVID-19 AT LAKE CARL BLACKWELL

Major Field: LEISURE STUDIES

Abstract: COVID-19 had a major impact on many facets of life including the recreation habits of the public. Outdoor recreation was considered to be a safer alternative to indoor recreation during the COVID-19 pandemic. Lake Carl Blackwell is a park managed by Oklahoma State University that provides a recreational area for residents and visitors of Stillwater, Oklahoma. This study analyzed the number of general recreation passes and camping permits purchased the year before the pandemic and the years during the pandemic (January 2019 – May 2022) using an ANOVA test to determine if there was a significant difference in attendance and use. The amount of boating, personal watercraft, and equestrian, passes and permits purchased were also measured to examine how the pandemic had affected recreation participation at Lake Carl Blackwell.

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CHAPTER I

INTRODUCTION

Introduction

In modern history, leisure time has increased since the industrial era and this has provided more opportunities to engage in outdoor activities. Leisure time was once thought to be a privilege that the social elite experienced, with the average worker working 70 hours a week prior to the 1850's. Now that there is more leisure time available to the average citizen, compared to before the industrial revolution, more individuals chose to engage in outdoor recreation during their free time (Jensen & Guthrie p. 3, 2006).

Outdoor recreation can play an imperative role in several facets of life including adapting to the stressors caused by both everyday living and downtrodden times such as economic depressions and public health crises (Godbey, 2009). Participating in outdoor recreation is extremely important to many individuals during their leisure time. Engagement in outdoor recreation can provide individuals the opportunity to appreciate nature, destress, spend quality time with others, and deviate from the daily routines of life (Clemens, Palacios, & Lindenmeier, 2018). Numerous personal benefits are associated with engaging in outdoor recreation including the improvement of physical and psychological wellbeing (Jensen & Guthrie p. 3, 2006).

COVID-19 has affected leisure participation for different population groups in differing ways. Full-time working parents who have had to homeschool their children due to schools not holding classes or holding them online may have experienced a sudden decrease in amount of leisure time. However, some individuals have had their work moved online reducing commute time which has potentially provided more leisure time (Muts & Reimer, 2021). This changing of leisure time coupled with many desiring to reduce symptoms of stress caused by the effects of the pandemic has affected attendance and utilization of many outdoor recreation facilities worldwide (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020). This has been noticeable in the United States as there has been an increase in park utilization, as an estimated 7.1 million more Americans engaged in outdoor recreation in 2020 than in 2019 (Outdoor Foundation, 2021).

Located 8 miles west of Stillwater Oklahoma, Lake Carl Blackwell is a park managed by Oklahoma State University (OSU) that provides opportunities for participating in recreational activities including hiking, mountain biking, hunting, camping, horseback riding, fishing, and picnicking. Lake Carl Blackwell was constructed in 1937 and spans across a land surface of 3,370 acres (Travel OK, 2022). The park is named after Carl Petty Blackwell who was the dean and director of the College of Agriculture at Oklahoma State University (Blackwell, 1924).

Statement of Problem:

During times of societal stress and turbulence, and public health concerns, outdoor recreation has played an imperative role in people's lives (Godbey, 2009; Samuelsson et al, 2020). Since 1937, Lake Carl Blackwell has provided an outdoor space

utilized by the local community of Stillwater as well as visitors to the area to participate in a variety of recreational activities. The attendance at LCB has appeared to have changed since COVID-19 has entered the United States.

COVID-19 has had a significant impact on the rate of participation of outdoor recreation around the world. Many outdoor recreation facilities are experiencing issues with funding, staffing, and having enough proper infrastructure to adequately adapt to the variation of outdoor recreation participation (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020). Based on Sense of Coherence (SOC) which is part of the Salutogenic Model (Mittlemark & Bauer, 2017), parks may provide a resource for stress relief during the pandemic (Godbey, 2009); however, the rate of park utilization is likely to have changed (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020).

Purpose of the Study

The purpose of this study is to analyze and compile existing data to determine the attendance of patrons and patron use of Lake Carl Blackwell before and during the pandemic. This information could be helpful for Lake Carl Blackwell administration in decision making about budgeting for infrastructure, facilities, programming and staffing in order to adapt to changes that COVID-19 has caused.

Research Question 1

How has the pandemic and related factors affected the attendance of patrons at LCB?

Research Question 2

Has the pandemic and related factors affected the outdoor recreation participation at LCB?

H1: There was an increase in camping permits sold during the pandemic months compared to the year prior to the pandemic for the corresponding months.

H1₀: There was no difference in camping permits sold during the pandemic months compared to the year prior to the pandemic for the corresponding months.

H2: There was an increase in daily recreation permits sold during the pandemic months compared to the year prior to the pandemic for the corresponding months.

H2₀: There was no difference in daily recreation permits sold during the pandemic months compared to the year prior to the pandemic for the corresponding months.

Definition of Terms

Leisure – “Leisure is time free from work and other obligations, it also encompasses activities which are characterized by a feeling of comparative freedom” (Parker, 1976 p. 48).

Recreation - “Recreation is considered to be activity voluntarily undertaken, primarily for pleasure and satisfaction, during leisure time” (Pigram, 1983 p. 3).

Outdoor Recreation (OR) - “Outdoor recreation includes activities that occur outdoors in an urban and man-made environment as well as those activities traditionally associated with the natural environment” (Phipps, 2018).

Sense of Coherence (SOC) - “a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that one’s internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected” (Mittlemark & Bauer, 2017).

Limitations and Assumptions of the Study

Potential limitations are as follows:

1. Data that is collected regarding LCB may not pertain to other recreational areas and facilities
2. Information regarding LCB is limited to existing or historical data
3. There is a lack of public existing data regarding LCB

Assumptions regarding data:

1. The data provided is assumed to be accurate and complete.
2. It is assumed that persons providing understand that the data will be used for thesis research.

CHAPTER II

LITERATURE REVIEW

Outdoor Recreation

The word “recreation” comes from the Latin roots *recreate*, which means to “create anew” or “rebirth”. Traditionally, recreation was thought to be a post-work recovery; however, this does not reflect the way that recreation is currently thought of by the general public. Recreation is considered to be something that is done for sake of participating in it or something that is intrinsically motivating (Jensen & Guthrie p. 7, 2006).

Recreation can be described as having these aspects:

- An activity,
- Occurring during leisure,
- Voluntary,
- Intrinsically motivating,
- Provides a sense of competence in the activity,
- Provides a sense of well-being.

Outdoor recreation was initially defined as recreation that occurred outside. This definition was recognized as being too broad as it includes activities such as sports that

did not emphasize the outdoor elements (Jensen & Guthrie p. 8, 2006). Generally, outdoor recreation is associated with elements of the environment (Phipps, 2018).

Outdoor recreation can be organized into three different subcategories: resource-oriented recreation, intermediate recreation, and user-oriented recreation (Jensen & Guthrie p. 8, 2006)

Resource-oriented recreation includes the recreational activities that are focused on the natural elements of the outdoors. Resource-oriented recreation may include activities like nature walks and birdwatching. Intermediate recreation combines elements of resource-oriented recreation and user-oriented recreation. This form of recreation involves the environment and human impact. Intermediate recreation would include outdoor activities such as skiing and hunting. Lastly, there is user-oriented recreation which is based on the use of facilities. This type of recreation may include athletic events or outdoor theater (Jensen & Guthrie, 2006 p. 8).

Outdoor Recreation and Health Benefits

Outdoor recreation has been linked to many positive mental and physical health outcomes (Godbey, 2009; Thomsen et al, 2018). Outdoor recreation facilities are thought to have unique elements in their settings that contribute holistically to the health outcomes of participants. These elements help to provide a modality of exercise, an area to practice mindfulness, and community engagement (Godbey, 2009). Some of the elements may include hiking trails, outdoor swimming areas, and natural bouldering areas. There are also other factors associated with outdoor recreation that can contribute to positive health outcomes including social time spent with friends and family and a

sense of control and competence in activity participation (Thomsen et al, 2018). The importance of outdoor recreation during the pandemic may be significant due to the numerous health benefits it has the potential to provide.

Physical Health Benefits of Outdoor Recreation

Physical health benefits of simply walking outside include weight management, decreasing the likelihood of hip fractures, lowering bad cholesterol, and increasing joint and muscle strength (Godbey, 2009). There has been extensive research done illustrating positive physical health outcomes achieved by participating in various outdoor recreation activities including hiking, swimming, and climbing. Some of these positive outcomes include increased exercise, cardiovascular health improvement, increased muscle mass and strength, reduction in body fat percentage, lowering of blood pressure, improvement in respiratory health, increased flexibility, and improvement of sleep quality (Thomsen et al., 2018).

While there are indoor workout facilities that can provide similar physical health benefits, outdoor recreation facilities may provide intrinsic motivation for patrons to engage in physical activity. Intrinsic motivation provides the encouragement needed to positively address sedentary lifestyles by adding new activities to one's routine. Outdoor activities can be intrinsically motivating by a provision of a sense of community, encouraging new skill development, and being mentally stimulating (Mackenzie et al., 2018).

Mental Health Benefits of Outdoor Recreation

Outdoor recreation facilities have proven to be a reliable source of achieving physical exercise and subsequently obtaining the mental health benefits associated with it, including the reduction of symptoms of anxiety and depression (Godbey, 2009; Thompson et al., 2018; Mutz & Miller, 2016; Anderson & Shivkumar, 2013). With some outdoor recreation facilities implementing COVID-19 policies to prevent the spreading of the disease, the public has lost some accessibility to a means of physical exercise (Rice et al., 2020). However, despite some general policies implemented to prevent the spreading of COVID-19, outdoor recreation facilities have still been more widely utilized than in recent years (Cordell, 2021). This has made outdoor recreation facilities an important means of achieving physical exercise during the pandemic as indoor workout facilities have had more restrictions implemented that affect accessibility (Andreucci, 2020), due to COVID-19 being less transmissible in outdoor environments (Weed, 2020).

Multiple studies have shown that outdoor recreation can provide a significant improvement in mental well-being for participants by providing a means of physical exercise, a sense of community, being in a novel environment, and providing an area free of distraction and away from life stressors (Mutz & Miller, 2016). Some mental health benefits that outdoor recreation may provide include a reduction in symptoms of depression, improvement in self-esteem, attaining coping skills, increased quality of life, improvement of friend and family functioning, improvement in levels of happiness, and an increase in mindfulness (Thompson et al., 2018; Mutz & Miller, 2016).

Covid-19

Identified as starting in Wuhan China, in December of 2019, the COVID-19 virus has traveled globally causing a devastating impact. The virus has mutated into several variants that have different ranges of symptoms and transmissibility. The virus is transmissible through droplets carrying SAR-CoV-2t that can occur through coughing, sneezing, or talking. If these respiratory droplets come in contact with another individual and makes it to their respiratory system, they may be likely to be infected with COVID-19. In order to prevent transmission, many safety measures have been recommended including mask wearing, vaccinations, social distancing, and lockdown protocols. These measures were also implemented to decrease hospitalization rates so that the medical system would not become overwhelmed due to not having enough medical supplies, beds available, and staff. While Covid-19 is a disease that is capable of negatively affecting anyone that becomes infected it; the virus is often more harmful to older individuals or individuals that have a preexisting condition (CDC, 2022).

COVID-19 has had a devastating impact on the world since its public emergence in December 2019. The disease has affected the physical health of many individuals, harmed the global economy, and has caused the deaths of over 3 million individuals (Kumar, 2020). As of January 2022, Covid has been the cause of over 8 hundred thousand deaths in the United States alone and leaving thousands more with “long haul” symptoms (CDC, 2022).

COVID-19 has impacted individuals in many ways through increasing fear, isolation, feelings of insecurity, and confusion. The virus has also negatively affected communities by decreasing business, depleting local resources, and closing workplaces

and schools (Pfefferbaum, 2020). Due to the lockdowns, regular patterns and behaviors of the public were affected. Before the second and third waves of the pandemic, lockdown restrictions in the United States were eased, and some individuals chose to resume their previous activities at different rates (Spenneman & Whisted, 2021). The conditions for the pandemic continue to change as new variants such as omicron emerging. This means that precautions such as lockdowns, travel restrictions, and vaccination mandates continue to change depending on the location, government, public attitude, and local businesses policies (CDC, 2022).

COVID-19 United States Timeline

On January 20th of 2020, the first case of COVID-19 was confirmed in the United States, appearing in Washington state by CDC. Two days later, the WHO (World Health Organization) confirmed human-to-human spread of COVID-19. On March 13th, President Trump declared that COVID-19 was a nationwide emergency. Later in the same month, shutdowns of public schools and restaurants initiated to prevent the spreading of COVID-19. During this time, the United States passed the CARES act to provide funding to programs and businesses to aid with the costs of shutdowns. During that following May, the death toll for COVID-19 hit one hundred thousand in the United States. By September 2020, the death toll from COVID-19 doubled causing two hundred thousand deaths. In December 2020, the first COVID-19 vaccines in America achieved approval for use by the CDC, and by the end of the month, the first million vaccines were distributed. In February 2021, the death toll surpassed half a million. By March 13th, 2021, 100 million vaccines were distributed to the American public (CDC, 2022).

The Delta variant emerged shortly after the wide-spread use of the vaccine in June 2021, and soon became the most wide-spread variant in the United States. With the increases of cases due to the delta variant being more transmissible, the CDC encouraged the public to wear masks in indoor spaces. Later in the year, cases increased exponentially for a few months and then decreased rapidly towards the beginning 2022 (CDC, 2022).

COVID-19 Oklahoma History

On March 6th 2020, the first confirmed case of COVID-19 in Oklahoma first appeared in Tulsa. Shortly following this case, on March 16th of 2020, Kevin Stitt declares a State of Emergency for Oklahoma. On July 17th, 2020, Oklahoma governance passed a mask ordinance encouraging citizens to wear masks in indoor settings. By October 12th, 2020, Oklahoma surpassed one hundred cases of COVID-19. Oklahoma healthcare services started to administer vaccines on Dec. 14th, 2020, and by Feb. 26th of 2021, one million vaccines were administered to Oklahoma citizens (TIMELINE: COVID-19 Oklahoma, 2021). Between December and April 2022, generally, this has been a decrease in the number of cases and deaths of COVID-19 (Oklahoma State Health Department, 2022).

COVID-19 Impact on Outdoor Recreation

COVID-19 has affected the behavior of individuals due to both the disease itself and the policies written to decrease the rate of spread. One of these behavior changes includes participation in outdoor recreation. Changes in policies to prevent the spread of COVID-19 were a significant factor in this societal behavioral change. However, some

countries that had less restrictive policies regarding COVID-19 still experienced a decrease in outdoor recreational activity participation initially during the pandemic with lockdowns and social distancing. As time passed, restrictions decreased and vaccinations were created and distributed, the frequency of outdoor recreation generally increased for areas that experienced a decrease in outdoor recreation participation, dependent on the location, often to a higher frequency than before the pandemic (Fang, Zhu, Jiang, & Wu, 2021).

During the pandemic, there has been an increase in local outdoor recreation participation (Spenneman & Whisted, 2021). In the United States of America, there was a 2.2% increase in local outdoor recreation participation in 2020, indicating an increased demand (Rogers & Linbolm, 2021). The participation rate of engaging in outdoor recreation has been growing as demand for services have been increasing. An estimated 53% of Americans over the age of 6 participated in outdoor recreation in 2021, which is a record high. Approximately three quarters of the new participants are wanting to maintain their new outdoor recreation habits in the coming years (Cordell, 2021).

A contributing factor to this increase in demand is outside-of-country travel being heavily restricted to prevent the spreading of COVID-19, which increased the demand for domestic tourism within the United States (Spenneman & Whisted, 2021). Even with the demand for domestic tourism increasing, globally, there was a significant economic loss for the tourism industry. Many countries have implemented policies that have affected attendance to tourist destinations, this includes border closures and travel restrictions (Škare, 2021). Indoor recreation areas have had more restrictions placed on them than outdoor recreation areas, this has encouraged patrons to attend outdoor recreation

facilities during the pandemic. While visitation to outdoor recreation facilities has increased during COVID-19, the quality of the consumer experience has decreased for United States National Parks. The economic surplus of campsite visitation has been estimated to decrease between 19% and 26% (Landry et al., 2020).

The increase of demand for outdoor recreation due to COVID-19 is not a concept beholden to just the United States. Studies have indicated an increased demand for outdoor recreation in several countries including Germany and Australia (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020). In Germany, visitation for forest recreation has doubled since March 2020. This has increased the demand for the improvement of infrastructure and management for outdoor recreation facilities. Within the influx of new visitors, new demographics are attending the recreation facilities including younger families. This has also increased the demand for the creation of appropriate programming that would help maintain the growing interest (Derks, Gissen, and Winkel, 2020). From 2019 to 2020, Australian recreation facilities experienced the opposite issues as the German facilities (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020). While there was an increased demand for domestic tourism, Australian parks received less visitation due to the restrictions placed to prevent COVID-19 from spreading (Spenneman & Whisted, 2021). Whether the parks received a significant increase or decrease in visitation, both phenomena caused issues regarding resources (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020).

While there has been an overall increase in demand for outdoor recreation in the United States during the pandemic, certain demographics have experienced a decrease in the ability to partake in outdoor recreation. It has been demonstrated that there has been a

decrease in the urban population's ability to participate in outdoor recreation. This may be due to travel restrictions and increased costs associated with the activities. These individuals may be trying to conserve money and resources due to loss of income (Rice et al., 2020).

Stress and Outdoor Recreation in Consideration of COVID-19

Outdoor recreation has proven to be a potent means of reducing stress (Godbey, 2009). Stress has determinantal effects on the immune system, which may increase the likelihood of catching diseases and viruses (Godbey, 2009, Money et al., 2015). The increase of cortisol that stress induces can induce an inflammatory effect that delays the recovery time for physical injuries and illnesses (Money et al., 2015).

The presence of COVID-19 has caused several lifestyle changes for many individuals. Some of these lifestyle changes are due to policies changes to prevent the spreading of COVID-19, fear, and economic issues. Some of these lifestyle changes include experiencing less physical activity, increased drug usage, and increased alcohol usage. All of these factors can lead to an increase in stress (Lange & Nakmura, 2020). Stress often slows the recovery time of illness due to the overabundant release of cortisol, so it may be important to aid in reducing levels of the stress individual experience during a pandemic. The stress reduction that outdoor recreation provides could potentially play a role in promoting public health, which is a significant factor in combating the issues caused by COVID-19 (Cooke et al., 2020).

Obesity and Outdoor Recreation in Consideration of COVID-19

Obesity rates have been increasing in the United States at a rapid rate. The obesity rate in The United States increased 75% from 1991 to 2001 (Godbey, 2009). The rate of morbid obesity has gone up 733% from 1960 to 2012 (Revels et al., 2017). The causation of this issue is multifactorial. Increasing obesity rates can be related to economic issues, nutritional misinformation, changes in general public lifestyle among other factors. One of these factors is the decreasing physical movement of the general population (Godbey, 2009).

Restrictions implemented to reduce the spread of COVID-19 have played a role in increasing the obesity rate. Temporarily closing workout and recreational facilities have discouraged people from exercising. Economic and supply chain issues have also played a role in decreasing access to healthy food. There is a strong correlation between the obesity rate of a population and the hospitalization rate and death rate due to Covid-19 (Popkin et al, 2020).

While the obesity rate in the United States is infamously growing, the obesity epidemic is a global phenomenon (Godbey, 2009, Popkin et al, 2020). The growing obesity rate has affected lower, middle, and higher-income countries. For lower-income level countries, the problem is twofold as undernutrition tends to exacerbate the issue. The prevalence of obesity is not decreasing for any country (Popkin et al, 2020).

Around the world, outdoor recreation facilities have had restrictions placed on them with the notion that limiting outdoor group gatherings will help prevent the spreading of COVID-19 (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel,

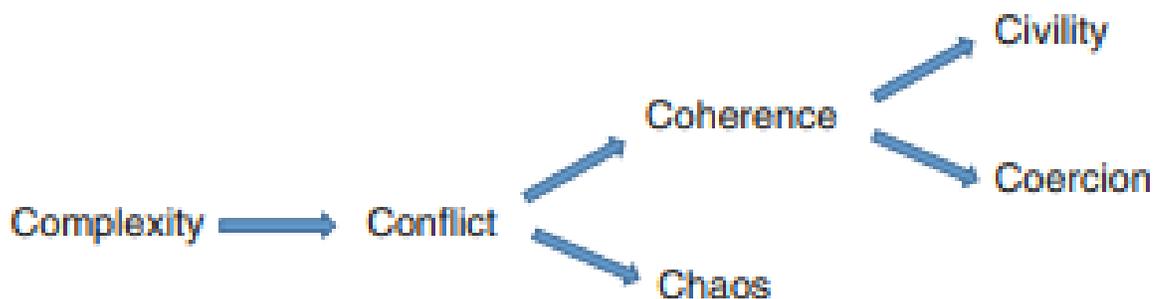
2020). While this may or may not help, the restrictions reduce opportunities for the public to exercise. Exercise helps maintain health in order to reduce the symptoms of COVID-19.

Sense of Coherence

Initially introduced in 1979, by Aaron Antonovsky in his published book, *Health, Stress and Coping*, Sense of Coherence (SOC) is a significant component of the Salutogenic Model. The Salutogenic Model posits that an individual's experiences throughout life sculpt their Sense of Coherence. Sense of Coherence was the term used by Aaron Antonovsky to reflect how individuals adapt to the stressors that the chaos of life caused (Mittlemark & Bauer, 2017).

Antonovsky created the six C's as discussed in an article he published in 1990. The six C's in relation to the Salutogenic Model are complexity, conflict, coherence, chaos, civility, and coercion (Figure 1) (Mittlemark & Bauer, 2017).

Figure 1



Note: The Six C's (Mittlemark & Bauer p 92, 2017).

Complexity refers to how a system is organized and the interactions within it. Within the system, there is the potential for conflict to arise. Coming from complexity, conflict is the tension that is created through the interactions within the system and interaction between individuals engaging in that system. As per Antonovsky's Salutogenic Model, conflict may lead to chaos, which can entail problematic outcomes including trauma and violence. Chaos can start at an individual level and then move to a group or societal level. To describe adapting or preventing the issues that arise from chaos, Antonovsky introduced the Sense of Coherence. Sense of Coherence can be further divided into two dimensions: civility and coercion. Civility is a concept built around respecting others despite any flaws or shortcomings. For a society to optimally function, Antonovsky believed that society needs to demonstrate civility by caring for individual members that of the society. Civility can be demonstrated through concepts like charities and social programs. Coercion is the opposite of civility; coercion entails poverty and oppression. Coercion in society can be exhibited through socioeconomic issues such as systemic racism (Mittlemark & Bauer, 2017 p 92).

SOC and Outdoor Recreation

SOC is developed through a combination of three different factors: (1) that stimuli, both external and internal are structured and predictable, (2) resources are readily available to provide for the demands of these necessary stimuli, and (3) the demands are worthy of investment and engagement. Individuals that have a higher SOC are more capable of handling the stressors of life (Super et al, 2015). Outdoor recreation facilities, like LCB, can provide the resources used to create these stimuli by providing an area to destress (Szovák et al., 2020).

The ability to ascertain a higher SOC may have been diminished since COVID-19 has been causing stress and reducing the availability of resources that could provide the necessary means of strengthening one's SOC. Physical activity and recreational programs have been linked to strengthening SOC for participants. COVID-19 has interrupted a sense of normalcy for many individuals as daily routines have changed for many. Restrictions to resources that can provide a means for escapism and destressing through physical activity and recreation have been placed, reducing the opportunity to increase one's SOC (Szovák et al., 2020). Outdoor recreation can provide a means of reducing stress and improving the well-being of participants (Godbey, 2009), which can be a significant factor in improving one's SOC. Depending on the administration organizations (local, state, and federal government; private entities, and businesses), COVID-19 prevention policies may affect the public's access to these outdoor resources (Spenneman & Whisted, 2021; Derks, Gissen, and Winkel, 2020).

LCB and SOC

LCB has provided an area for individuals to participate in leisure activities and physical activity during the COVID-19 pandemic (Travel Oklahoma, 2022). Engagement in physical activity and leisure activities has the potential to help increase one's SOC (Szovák et al., 2020). SOC is imperative to both an individual's well-being and the function of a community (Mittlemark & Bauer, 2017, p 92; Szovák et al., 2020). During the pandemic, greater numbers of attendance were noticed by the staff at LCB; however, the data from pass sales have yet to be analyzed (S. Jesse, January 20, 2022). Since outdoor recreation facilities can be a resource used to increase SOC among individuals and communities, analyzing pass sales and store receipts of attendees at LCB will help

provide insight into how often the public and visitors of the Stillwater and surrounding area utilized this resource that could potentially increase SOC.

Lake Carl Blackwell

LCB provides an area for recreational purposes for Stillwater residents and visitors. The area is also used by Oklahoma State University researchers for agricultural studies. LCB is considered to be a family-oriented area that provides many different amenities. Some of the amenities on the premise include an RV park with 242 camping spots with water and electric hookups, primitive camping with 86 tent sites, 60 miles of hiking trail, 7 cabins, picnic areas, proper infrastructure to dock and launch boats that operates 24 hours a day, and a convenience store that offers food and fishing supplies. There are 5 different hiking trails at LCB ranging from 5.76 miles to 18.5 miles. The trails transverse different types of terrain including grass fields, forested areas, and shorelines, and provide different levels of difficulty due to length, terrain, and navigation. These trails are utilized for hiking, biking, and equestrian purposes. LCB is highly regarded by patrons as it holds favorable reviews on their social media pages and on Google (Travel Oklahoma, 2022).

As noted by park staff, there has been a growing concern about maintaining and funding infrastructure, facilities, and park programming as there have been noticeably more patrons attending LCB. This is thought to be due to COVID-19 as more individuals are working remotely and inside recreational facilities have become more restricted because of safety measures such as movie theaters and museums (Landry et al, 2021). This has encouraged people to engage more in outdoor recreational activities which

recreational areas like LCB provide the means for (Landry et al, 2021; Travel Oklahoma, 2022).

At LCB, data regarding pass sales, reservations, and fees are maintained. The store on the premise also keeps track of its sales through store receipts. While this data is collected by park staff and the park store, the information regarding pass sales in recent years has not been analyzed to determine the effects of the pandemic on recreational use and attendance. Staff and ranger impressions of LCB during the pandemic have indicated that there may be an increase in usage of the recreational area. While an increase in sales and usage of the area would certainly be welcomed by the staff and management, there are concerns about the park infrastructure enduring the increased use and having the proper programming to manage the larger the attendance (S. Jesse, January 20, 2022).

CHAPTER III

METHODOLOGY

Data Collected

The data collected for this study is historic data of the different types of passes purchased by patrons of LCB. The passes that patrons can purchase for LCB include daily and annual passes. Patrons can purchase daily or annual passes and permits to participate in various leisure activities. The permits patrons can purchase include personal watercraft, equestrian, boating, and general recreation permits. There are also different types of camping for patrons at LCB including cabins and campgrounds for tents and RVs.

The data was obtained through a request to the managing ranger at LCB. After receiving the request, the managing ranger secured permission from his administration. The data requested and received includes all permit and pass types purchased each month of 2019-2022.

COVID-19 Timeline Justification

The data collected was historical data encompassing the years 2019 through May 2022. In 2019, LCB attendance and recreation participation was not affected by COVID-

19 as the first case of COVID-19 did not appear in Oklahoma until 2020. During 2020 and 2021, Oklahoma was significantly affected by COVID-19 as there were more than one million cases, mask mandates, school closings, and more individuals working from home. This data illustrates the effects of COVID-19 on LCB by showing the participation rates of different activities before and during the pandemic. This range of data may provide insight into the changes that occurred before and during the pandemic.

Data Collection

Research for this study utilized historical data to examine the changing rates of attendance and different types of leisure participation at LCB. The data regarding pass and permit purchases throughout 2019, 2020, 2021 and 2022 were requested from the manager of LCB. The data from the LCB management will include the receipts of the different types of passes and permits purchased, which can be utilized to indicate the frequency of attendance of LCB and the leisure activity the patrons engaged in.

Data Analysis

This data acquired was analyzed using SPSS to provide a visual of the change of frequency of the passes sold. The percent change of purchases of permits and passes are analyzed for both the total number of park passes sold between the years 2019-2022 and the various types of park passes and permits sold to provide insight into the different types of leisure activities of patrons at LCB. The differences in pass and permit purchases were shown in intervals of months throughout the years examined.

To determine if there was a significant difference in change of attendance and different types of leisure participation at LCB, an ANOVA test was used in SPSS to compare permit and pass sales for the years 2019, 2020, 2021, and 2022. Since COVID-19 was not reported to be in Oklahoma during 2019, the attendance at LCB, that year was utilized as the control to measure the significant difference from the rest of the years. An ANOVA test was also done on a month-to-month basis with the months in 2019 as the control.

This data provides a measurement of how much COVID-19 may have affected the attendance and different types of leisure participation on both a broad and more specific timespan. The measurement passes provides data used to answer RQ1, and sales of various permits provides data to answer RQ2, as well as H1 and H2.

CHAPTER IV

RESULTS

Overview

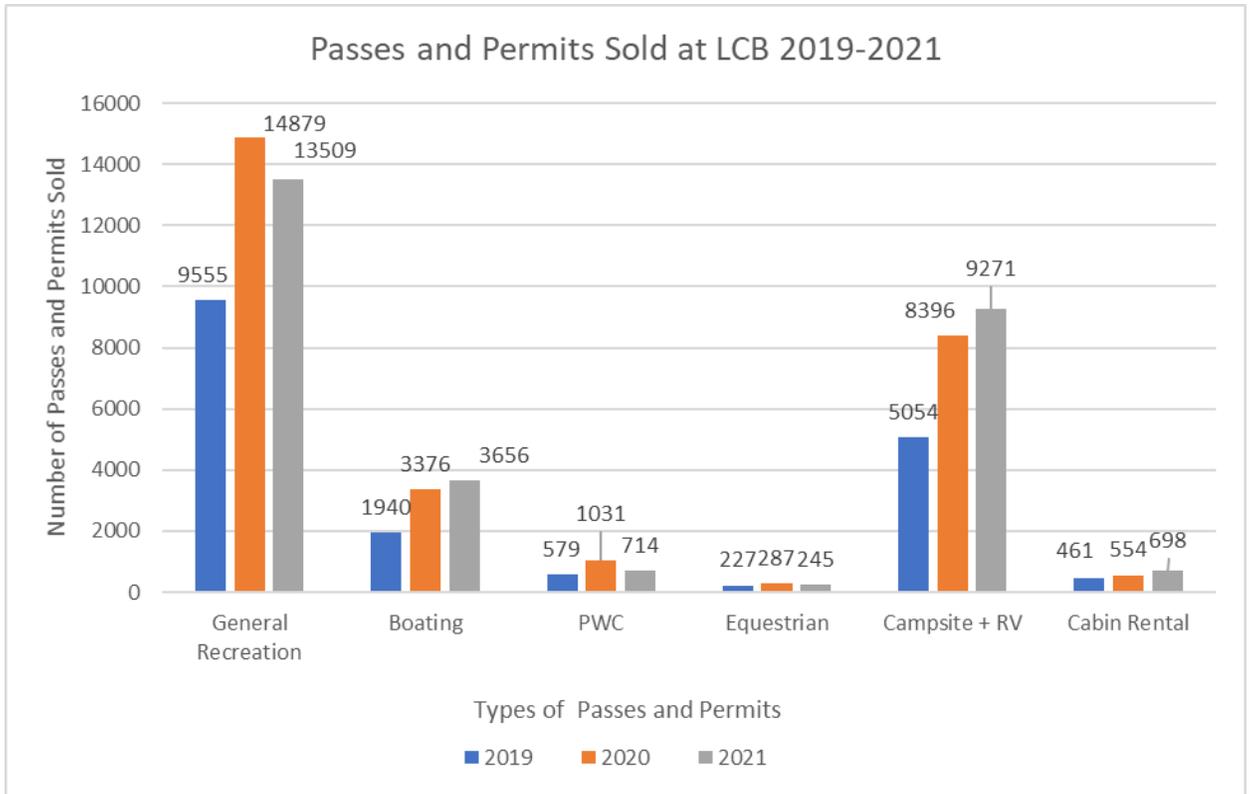
Data analyzed for this research consisted of the pass and permit sales of LCB during the years 2019, 2020, 2021, and the months of January through May of 2022. The passes and permits examined include general recreation, equestrian, personal watercraft, boating, RV, camping, and cabin rental. This data illustrated the effects of COVID-19 at LCB by demonstrating if there was a significant difference in the number of passes and permits purchased between the year 2019 and the years 2020, 2021, and the first five months of 2022 using an ANOVA test. The data received for this research was initially formatted in gross dollar sales of the permits and passes sold. The dollar sales were converted into pass and permit sales by dividing the gross dollar amount by the cost of each individual permit and pass. Because of this process, RV and ground camping had to be combined. Passes and permits were also combined in the total count.

Research Question I

Research question 1 was: How has the pandemic and related factors affected the attendance of patrons at LCB? To answer this, historical data regarding the purchases of

general recreation passes from the months of 2019, 2020, 2021 were compared. In 2019, 9,555 General Recreation permits and passes were purchased for the entirety of the year (See Figure 1 and Table 1).

Figure 2



Note: General Recreation, Boating, PWC, Equestrian, Campsite, RV, and Cabin Rentals Passes and Permits sold through 2019, 2020, and 2021.

Table 1*Passes and Permits Sold at LCB 2019-2021*

Passes and Permits Sold	2019	2020	2021
General Recreation	9555	14879	13509
Boating	1940	3376	3656
PWC	579	1031	714
Equestrian	227	287	245
Campsite + RV	5054	8396	9271
Cabin Rental	461	554	698

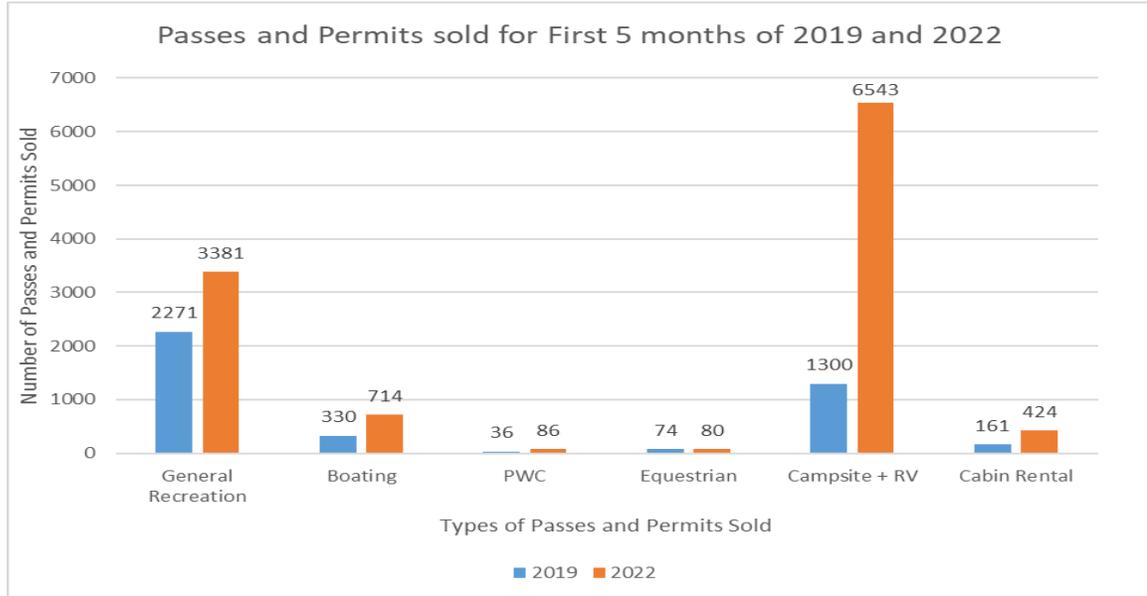
Comparatively, in 2020, 14,879 were purchased, indicating a 55.72% increase in permit and pass sales collectively (See Table 2).

Table 2*Percent Change of Passes and Permits Sold for 2020 and 2021 relative to 2019*

Passes and Permits	2020	2021
General Recreation	55.72%	41.37%
Boating	73.98%	88.45%
PWC	78.20%	23.41%
Equestrian	26.21%	7.74%
Campsite + RV	66.13%	83.43%
Cabin Rental	62.27%	80.74%

In 2021, 13,509 permits and passes were purchased at LCB (See Figure 1 and Table 1), a 41.37% increase from 2019 (See Table 2). During the first five months of 2022, 3,381 permits and passes were sold (See Figure 2 and Table 3). This was an increase of 48.87% (See Table 4) from the first five months of 2019, which had 2,271 permits and passes sold (See Figure 2 and Table 3).

Figure 3



Note: General Recreation, Boating, PWC, Equestrian, Campsite, RV, and Cabin Rentals
 Passes and Permits sold through the first five months of 2019 and 2022

Table 3

Passes Sold in the First Five Months of 2019 and 2022

Passes and Permits	2019 January-May	2022 January-May
General Recreation	2271	3381
Boating	330	714
PWC	36	86
Equestrian	74	80
Campsite + RV	1300	6543
Cabin Rental	161	424

Table 4*Percent Change of Passes and Permits Sold for 2022 Jan-May relative to 2019 Jan-May*

Passes and Permits	2022 May-Jan
General Recreation	48.87%
Boating	115.96%
PWC	141.27%
Equestrian	8.24%
Campsite + RV	403.24%
Cabin Rental	162.54%

Historically, the months May through August are when the most permits and passes are purchased at LCB. During these months more general recreation passes and permits were purchased individually in both 2020 and 2021 than in 2019. In 2019 6,425 general recreation passes and permits were purchased, and respectively, 10,989 and 10,137 general recreation passes and permits were purchased in 2020 and 2021 (See Figure 3). During the years when COVID-19 was more prevalent, LCB saw more attendance than in the year prior.

Research Question II

Research Question 2 was: Has the pandemic and related factors affected outdoor recreation participation at LCB? To answer this, historical data regarding the purchases of boating, PWC, equestrian, campsite and RV passes and permits and cabin rental from the months of 2019, 2020, 2021 were compared. During 2019, LCB sold 1,940 boating passes and permits, 579 PWC passes and permits, 227 equestrian passes and permits, 5,054 campsite and RV passes permits, and 461 cabin rentals (See Table 1 and Figure 1). In 2020 LCB sold 3,376 boating passes and permits, 1,031 PWC passes and permits, 287 equestrian passes and permits, 8,396 campsite and RV passes permits, and 554 cabin

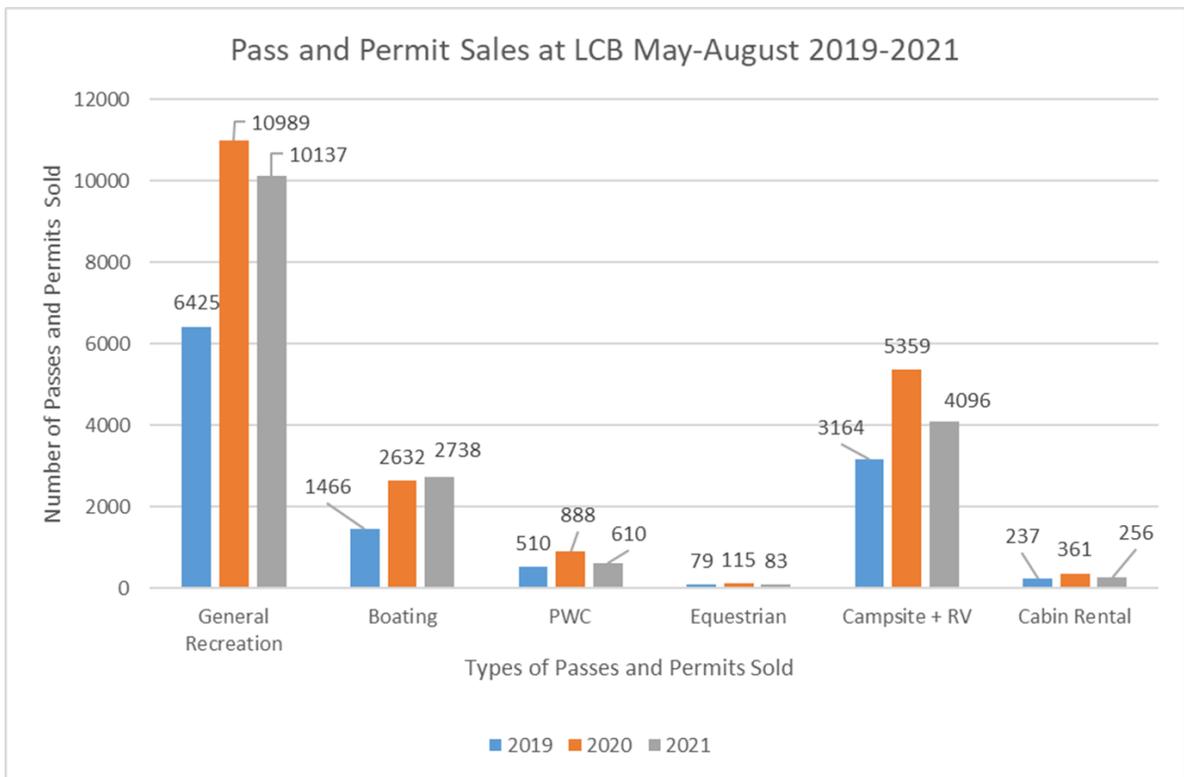
rentals (See Table 1 and Figure 1). Respectively to each permit and pass type, there was a 73.98%, 78.20%, 26.21%, 66.13%, and 62.27% increase Comparing 2020 to 2019, there an increase of 73.98% purchases for boating passes and permits, a 78.2% increase for purchases of PWC passes and permits, a 26.21% increase for purchases of equestrian passes and permits, a 66.13% increase for purchases of campsite and RV passes and permits, and an increase of 62.27% (See Table 2).

In 2021, LCB sold 3,656 boating passes and permits, 714 PWC passes and permits, 245 equestrian passes and permits, 9,271 campsite and RV passes permits, and 698 cabin rentals (See Table 1 and Figure 1). Comparing 2021 to 2019, there an increase of 88.45% purchases for boating passes and permits, a 23.41%, increase for purchases of PWC passes and permits, a 7.74% increase for purchases of equestrian passes and permits, a 83.43% increase for purchases of campsite and RV passes and permits, and an increase 80.74% (See Table 2)

In the first five months of 2019, LCB sold 330 boating passes and permits, 36 PWC passes and permits, 74 equestrian passes and permits, 1,300 campsite and RV passes permits, and 161 cabin rentals (See Figure 2 and Table 3). In the first five months of 2022, LCB sold 714 boating passes and permits, 86 PWC passes and permits, 80 equestrian passes and permits, 6,543 campsite and RV passes permits, and 424 cabin rentals (See Figure 2 and Table 3). Comparing the first five months of 2022 to the first five months of 2019, there an increase of 115.96% purchases for boating passes and permits, a 141.27%, increase for purchases of PWC passes and permits, a 8.24% increase for purchases of equestrian passes and permits, a 403.24 %, increase for purchases of campsite and RV passes and permits, and an increase 162.54% (See Table 4).

When comparing May through August, for 2019, 2020, and 2021, more boating, PWC, equestrian, camping, and cabin rental passes and permits were purchased individually in 2020 and 2021 than in 2019. In 2019 1,466 boating, 510 PWC, 79 equestrian, 3,164 campsite and RV passes and permits were purchased, and 237 cabin rentals. In 2020, 2,623 boating, 888 PWC, 115 equestrian, 5,359 campsite and RV passes and permits were purchased, and 361 cabin rentals. In 2021, 2,738 boating, 610 PWC, 83 equestrians, 4,096 campsite and RV passes and permits were purchased, and 256 cabin rentals (See Figure 3).

Figure 4



Note: General Recreation, Boating, PWC, Equestrian, Campsite, RV, and Cabin Rentals Passes and Permits sold through 2019, 2020, and 2021.

Hypothesis I

The first hypothesis tested was: There was an increase in camping permits sold during the pandemic months compared to the year prior to the pandemic for the corresponding months.

To test this hypothesis, the means of camping permits purchased at LCB in 2019, 2020, 2021, and 2022 were compared using an ANOVA test to determine if there a statistically significant differences in sales between all the years. The camp permits purchased included RV and campground permits purchased combined in all campgrounds at LCB excluding cabins. The p-value for total camping permits purchased comparing the years tested was .000 (See Table 5). Since there was a p-value of $<.05$, there was a statistically significant difference determined in camping permits purchased at LCB between the months between the months January 2019 through May 2022. This indicates that the null hypothesis can be rejected since there was a significant difference in the amount of camping permits purchased during these months.

Table 5

ANOVA for Total Daily Recreation Passes Total Campsite and RV Permits Purchased Jan 2019-May 2022

	N	Sig. Dif.
Total Daily Recreation Passes	41	.000
Total Campsite and RV Permits	41	.011

Hypothesis II

The second hypothesis tested was: There was an increase in daily recreation permits sold during the pandemic months compared to the year prior to the pandemic for

the corresponding months. To test this hypothesis, the means of daily recreation passes purchased at LCB in 2019, 2020, 2021, and 2022 were compared using an ANOVA test to determine if there a statistically significant differences in sales between all the years. The daily recreation passes purchased include ones purchased at the booth and the office. The p-value for total daily recreation passes purchased comparing the years tested was .011 (See Table 5). Since there was a p-value of $<.05$, there was a statistically significant difference in camping permits purchased at LCB between the months between the months January 2019 through May 2022. This indicates that the null hypothesis can be rejected since there was a significant difference in the amount of daily recreation passes purchased during these months.

Conclusion

This study used data received from LCB management to answer two different research questions and utilized an ANOVA test to evaluate two separate hypotheses. To answer RQ1: “How has the pandemic and related factors affected the attendance of patrons at LCB?”, the amount of general recreation passes purchased was calculated for the years 2019, 2020, 2021, and the first five months of 2022. These years were selected because they range before and during the pandemic. All years after 2019 had more purchases of general recreation permits sold indicating there was a higher attendance rate. To answer RQ2 “Has the pandemic and related factors affected the outdoor recreation participation at LCB?”, the amount of boating, PWC, equestrian, campsite and RV passes and permits, and cabin rental was calculated for the years 2019, 2020, 2021, and the first five months of 2022. All years after 2019 had more sales of all of the passes, permits, and rentals measured.

When utilizing the ANOVA test for H1: “There was an increase in camping permits sold during the pandemic months compared to the year before the pandemic for the corresponding months.” There was a statistically significant difference found for camping permits sold during the years 2019, 2020, 2021, and the first five months of 2022 indicating that the null hypothesis should be rejected. When utilizing the ANOVA test for H2: “There was an increase in daily recreation permits sold during the pandemic months compared to the year before the pandemic for the corresponding months.” There was a significant statistical difference found for daily recreation permits sold during the years 2019, 2020, 2021, and the first five months of 2022 indicating that the null hypothesis should be rejected. The results of the ANOVA for both H1 and H2 indicate there was a change in the attendance and types of recreation that patrons participated in at LCB during the pandemic. All purchases of permits, passes, and rentals were higher than 2019.

CHAPTER V

DISCUSSION

Introduction

There have been numerous studies evaluating the effects of COVID-19 on outdoor recreation. The majority of the studies looked at local policy and more individuals working from home. The purpose of this study was to compile data from LCB management to analyze what changes in attendance and leisure participation occurred during the pandemic. After gathering the data, converting the gross profits into permits and passes sold, and using an ANOVA test, it was found that attendance and campsite usage had significantly increased. It was also found that more equestrian passes and permits, PWC passes and permits, boating passes and permits, and cabin rentals were purchased each year since 2019. These results correlate with the statements of the park staff about witnessing more attendance at LCB.

Implications

Data analyzed and evaluated for this study could potentially be useful to the LCB administration for decision-making about budgeting for infrastructure, facilities, programming, and staffing to adapt to changes that COVID-19 has caused. As more patrons are attending LCB, infrastructure and facilities degrades with more usage,

including campsites, RV hookups, and docking areas. Knowledge of what recreation areas of LCB are utilized more will aid with making decisions on where to allocate funds. It has been noted by staff that equipment has been damaged more as more patrons are attending and participating in recreational activities. With this data, it may be possible to form a report and research articles regarding the increased attendance of patrons during COVID-19.

The data collected and analyzed for this study may indicate that several areas of the park would benefit from having more funding for infrastructure including, the boating area, cabins, RV, campgrounds, and equestrian trails. Programming at LCB regarding these areas may also benefit from more funding with the increased participation. Hiring more staff may also be useful for programming maintenance issues regarding the higher participation rates.

Previous studies have indicated that most individuals that have newly started their outdoor recreation participation habits during the pandemic want to maintain their hobbies. This could imply that most of the patrons recently attending and engaging in recreational activities at LCB during the pandemic may desire to continue attending in the future. This may mean that any plans for construction of new infrastructure and programming may need to take into consideration a higher attendance and participation rates.

Outdoor recreation has proven to be an effective method of reducing stress, achieving physical exercise, and a healthy way to socialize during a pandemic. Therefore, it would be a public health benefit for the citizens of Stillwater and visitors to improve the infrastructure, facilities, and programming of LCB to better handle this increased

participation. With more funding and improved infrastructure, LCB may continue to be a means of increasing the citizens' and visitors' SOC as they use LCB to handle the chaos of life.

With more individual's coming to LCB, it may be expected that LCB may produce a higher profit than in the previous years before COVID-19. With the funds appropriately utilized, LCB can use these profits to produce a better experience for the patrons as recreation areas and programs being improved.

Limitations

There are multiple limitations to this study. Data collected and analyzed for this study may only pertain to LCB and not other recreational facilities. Also, information regarding LCB is limited to existing or historical data. The data collected by the agency is assumed to be correct. There is also a lack of public existing data regarding LCB.

The park attendance for LCB was measured by the number of park passes and permits purchased. However, these passes are for vehicles that enter the park and not per patron of the park. It was assumed that more vehicles entering the park meant there was a higher attendance for LCB. Participation rates may be different than what was stated in this study.

Data collected by the park was documented in dollars and then converted into the number of passes and permits purchased. The number of permits purchased for tent campsites and RV camping were combined due to them being documented as a lump sum. The cost for RV spots is \$35, and the cost for tent campsites is \$25. To estimate the total number of camping passes purchased, the lump sum documented by the average cost

of the RV campsite passes and campsite passes which was \$30. Similarly, cabin rentals were also documented as a dollar lump sums. Cabin rentals have a variety of different cost at LCB, so an Average of \$130 was utilized to derive the number of rentals purchased for each year.

Another limitation of this study is that it did not evaluate the years before 2019 to get a more accurate attendance rate before COVID-19. Studying a range of a few years before COVID-19 had an impact at LCB may have provided a more accurate representation of attendance of patrons and leisure activities they were participating in.

Future Research

This study focused on the year evaluation of passes and permits. Future research could potentially focus on comparing individual months or seasons to each other in terms of passes and permit sold. They may also be an opportunity to further research with observational findings, including visually observing how many patrons are attending LCB post COVID-19 and what recreational activities they are engaging in. Observation of the status of facilities, infrastructure, and equipment at LCB may also help indicate usage. Similar studies could be performed on other parks to evaluate how parks and other outdoor recreation facilities have been affected by COVID-19 to ascertain how COVID-19 has affected outdoor recreation facilities on the state or national level.

Conclusion

This study found that more patrons attended LCB during the pandemic than the year before. There was a significant statistical difference in daily recreation passes purchased in 2019 than in individually 2020, and 2021. In the first five months of 2022,

there were more daily recreation passes sold than in the first five months of 2019. There was also a statistical difference in camping permits purchased during that same timeframe. It was found that more passes and permits for boating, PWC use, and equestrian trails were purchased in 2019 than individually in 2020, and 2021. Comparatively, there were also more of these passes and permits sold in the first five months of 2022 than in the first five months of 2019. This research could potentially aid LCB management in budget-making decisions and be a guide for furthering research regarding the effects of COVID-19 at other outdoor recreation facilities. The research done can also be utilized to help give insight into the behavior patterns of individuals during a pandemic and how that may affect outdoor recreation habits.

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APPENDIX

Mrs. Brinker and Buzzard,

Once again, this is Michael Bruns, the graduate student in the Recreation Management program at OSU requesting data pertaining to Lake Carl Blackwell pass and permit sales for my thesis researching the effects of COVID-19 on outdoor recreation usage and participation.

I have passed my proposal and have permission from my committee to take the next steps in my research. I am requesting pass and permit sales totals on a month-by-month basis for January 2019 – May 2022. I would like to get annual and daily passes and permit sales for cabin rentals, RV camping, primitive camping, personal watercraft, boating, and equestrian.

I am not sure what format the data is in for your use, but I am sure that whatever you have can be useable. I will be converting the data into an Excel spreadsheet and then using SPSS to analyze data. When you have the data, please just email it to me, or let me know how you would like to handle this. Thank you.

I deeply appreciate your help in this research. If you have questions, please contact me at mibruns@okstate.edu, 405-820-3818 or my advisor Dr. Lindenmeier at donna.lindenmeier@okstate.edu, 405-744-3700, 660-853-9796.

Sincerely,

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VITA

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