THESIS

EXPLORING THE OVERALL, DISTRIBUTIONAL AND RESILIENCY IMPLICATIONS OF INVESTMENTS IN RURAL OUTDOOR TOURISM: THE CASE OF FISHERS PEAK STATE PARK

Submitted by

Skyler Schuck

Department of Agricultural and Resource Economics

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Summer 2023

Master's Committee:

Advisor: Dawn Thilmany

Stephan Weiler
Rebecca Hill
Jude Bayham

ABSTRACT

EXPLORING THE OVERALL, DISTRIBUTIONAL AND RESILIENCY IMPLICATIONS OF INVESTMENTS IN RURAL OUTDOOR TOURISM: THE CASE OF FISHERS PEAK STATE PARK

The recently christened Fishers Peak State Park offers great potential to give a much-needed boost to the economy of Las Animas County, specifically the town of Trinidad. State parks tend to draw tourism and may even improve the quality of life for current citizens or potential new workforce entrants (a benefit to employers), representing direct and spillover economic and societal benefits to the region. Yet, not all in the region may experience the same benefits. This paper seeks to estimate the overall and distributional income effect of the new state park through traditional empirical tourism expenditure modeling and input-output model analysis, with particular attention to and consideration for how different development approaches may affect outcomes.

The framing and applied case study of this work is intended to serve as a toolkit for rural communities seeking to more holistically evaluate infrastructure development options to help them maximize the strength of key economic indicators that are keystones for economic resiliency. We seek to apply the same tourism and hospitality dependency methodology from Watson & Deller (2022) to assess resiliency in the region. But, to contribute to more nuanced understanding of the region's potential impacts, the analysis will apply a more focused lens by using refined location quotients for employment concentrations and data from the restricted QCEW, and by using both the Great Recession (2007-2009) and COVID-19 Pandemic (2019-2021) as shocks.

ACKNOWLEDGEMENTS

I would like to thank my advisors and mentors in Dawn Thilmany, Stephan Weiler, Rebecca Hill and Jude Bayham. I would also like to thank the Trust for Public Lands, Colorado Department of Natural Resources, Division of Parks and Wildlife, and the Colorado Department of Labor of Employment for providing critical data and resources for my analysis. Many thanks to my fellow DARE grad students, the REDI team, my mentors at the City and County of Denver, and the wonderful TED team at OSPB; y'all are rockstars and I wouldn't have survived grad school without your support.

Finally, a huge thank you to my partner for her never-ending support, encouragement, and thoughtfulness. I am forever grateful to have such a wonderful and intelligent person in my life.

11:11, 831

DEDICATION

I would like to dedicate this thesis to Edgar, Mac, Roxy, Lu, Max, and Ruby

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

Introduction & Background

1.1 Introduction to State Parks as a Tourism Asset

The recently christened Fishers Peak State Park offers great potential to give a much-needed boost to the economy of Las Animas County, specifically the town of Trinidad. State parks tend to draw tourism and may even improve the quality of life for current citizens or potential new workforce entrants (a benefit to employers), representing direct and spillover economic and societal benefits to the region. Yet, not all in the region may experience the same benefits.

This article seeks to estimate the overall and distributional income effects of the new state park through traditional empirical tourism expenditure modeling and input-output model analysis, with particular attention to and consideration for how different development approaches may affect outcomes. If one of the region's goals is to improve outcomes for low-income earners and minority communities in the greater Las Animas County area, it is important that estimates of impacts do not discount the differential effects of public amenities on marginalized communities. Updating previous models of Colorado recreational developments (Weiler 2006; Weiler & Seidl, 2004), this study will aim to consider how varying business development, housing affordability, and general welfare considerations can be integrated into development alternatives and their distributional outcomes.

If analysis finds that the park will improve the income of the lowest quintile of households in Las Animas County, policy makers can focus budget on housing and public projects that allow those households to elevate their situation that improve the welfare of residents with non-monetary mechanisms. However, if analysis concludes that household income for the lowest quintile remains unchanged or falls with the addition of the park, then policy makers should focus on a suite of workforce, entrepreneurial and business development programs that allows a larger share of the region's households to create and capture new economic activity through nurturing business growth or job quality opportunities that would eventually raise household incomes.

This paper also seeks to serve as a toolkit for rural communities seeking to more holistically evaluate infrastructure development options to help them maximize the strength of key economic indicators that are keystones for economic resiliency. Rural areas have long faced an uphill battle mitigating the damage caused by economic downturns and a common driver is over-dependence on one primary economic sector. Major natural amenity sites such as state parks, and more specifically Fishers Peak, can potentially serve as catalysts for diversifying regional economic development and growth through tourism and the accompanying economic activity it may bring to the area.

However, a careful pitfall to avoid is becoming a non-diversified economy overly dependent upon tourism (which may be even more challenging than dependence on the primary industries from which they hope to diversify). As the regional economics field has shown that employment diversity is a strong indicator of economic resiliency (Watson & Deller, 2022), this paper seeks to identify whether Fishers Peak State Park will add economic resiliency into the Las Animas County. To do so, we consider resiliency metrics in comparable areas before and after recent economic shocks such as the Great Recession and the COVID-19 Pandemic.

The analysis of economic resilience in comparable areas will utilize, update and customize the methodology identified in Watson & Deller (2022) to the specific project site of interest: Southern Colorado. The literature recently has aimed to capture the effects of tourism and regional resiliency on a larger national scale (Watson & Deller, 2022).

In this paper we seek to apply the same tourism and hospitality dependency methodology from Watson & Deller (2022) to assess resiliency in the region. But, to contribute to more nuanced understanding of the region's potential impacts, the analysis will apply a more focused lens by using refined location quotients for employment concentrations and data from the restricted QCEW, and by using both the Great Recession (2007-2009) and COVID-19 Pandemic (2019-2021) as shocks.

1.2 Background on Fishers Peak State Park and Las Animas County

The city of Trinidad is located in a rural area along the I-25 corridor about 15 miles north of the Colorado-New Mexico border, with Fishers Peak less than 10 minutes from the city of 8,329 residents (Quickfacts, 2020). Like many rural towns in Colorado, it has been struggling economically. The town has a median income ($37,196) that is 48.5% lower and poverty rate (20.2%) that is 11.2% higher than the state average. In terms of demographics, the city is 83.2% white, but with 50.3% reporting they identify as Hispanic/Latinx. In Las Animas County, the city of Trinidad is the most populous community and is the county seat. Las Animas County has a population of 14,555, a median income of $44,159, a poverty rate of 18.2%, and 38.7% Hispanic/Latinx (Quickfacts, 2020). Thus, the city and county provide an interesting case study for the potential effects of outdoor recreation agritourism on rural areas facing challenges related to elevating economic prosperity.

The main feature of Fishers Peak State Park is Fisher's Peak, a 9,633-foot flat-topped mesa in the Sangre de Cristo range (*Colorado State Parks: Fishers Peak*, 2022). The park opened with 250 acres accessible to park visitors with a picnic area and three trails: First Look Trail, Discovery Trail, and Challenge Trail (*Colorado State Parks: Fishers Peak*, 2022). With help from the City of Trinidad and Great Outdoors Colorado, the 19,200-acre property was initially purchased by The Nature Conservancy and Trust for Public Lands (TPL) from private owners on February 28, 2019. In September 2019, Colorado Governor Jared Polis signed an executive order to officially pave the way for Colorado Parks and Wildlife to purchase the property from the Trust for Public Lands and The Nature Conservancy on April 2, 2020. On July 16, 2020, the Colorado Parks and Wildlife Commission formally approved naming the property, Fishers Peak State Park. As of June 2023, Fishers Peak State Park is now up to 13 miles of trails, main trail is within 0.5 miles of of the Peak. The Master Plan states that when fully complete, the park will feature 74 miles of multi-use trails, 14 miles of hiking-only trails, 10 miles of bike-only trails, and 25 miles of equestrian routes.

Chapter 2

Distributional Income Effects from Fishers Peak

2.1 Introduction to Fishers Peak Case Study

State parks tend to draw tourism dollars as well as serving as a catalyst to improve the subjective quality of life for the citizens and regional workforce (an indirect benefit to employers) in adjacent areas. Fishers Peak State Park can be an important agent of change within the community of Las Animas County and Trinidad, CO. Tourism benefits the broader state economy in the form of entry fees, hunting and fishing licenses, and other direct costs to use the parks, as well as local area businesses in the form of spending on goods and services. Finally, increasing the popularity and visibility of the local area may have broader benefits that support the concepts embedded in community capitals. Yet, the potential benefits may be affected by choices made related to the development of and connections to the new state park (Pender, Marré, & Reeder, 2012). This article seeks to measure both the aggregate and distributional income effects of the new state park in the region through traditional empirical tourism visitation modeling and input-output model analysis with a particular focus on how it affects low income households.

The specific research question relates to measuring the potential effectiveness of tourism expenditures for improving outcomes for low-income earners and minority communities in the greater Las Animas County area. Existing literature has been focused on the total impact of tourism expenditures and has overlooked or discount exploring of the effects of public amenities on economically disadvantaged communities. This article seeks to fill that gap. Data from IMPLAN, Census American Community Survey (ACS), and Colorado Parks and Wildlife (CPW) will be used to estimate the effects of the park. The models developed for estimating tourism visitation for this article will be based on those from Weiler (2006) and Weiler & Seidl (2004).

A key reasoning behind the specific interest of distributional income effects of tourism expenditures stems from the visibility and concerns surrounding the perception and data documenting increased income inequality in many of Colorado's other regional recreation magnets including ski counties such as Eagle County (Vail, CO), Pitkin County (Aspen, CO), Routt County (Steamboat Springs), and San Miguel County (Telluride, CO) (Sanchez, 2018). These local economies exhibit market failures related to the market power and distribution of benefits as evidenced by low housing affordability and inconsistent employment opportunities given the seasonality and housing demand tied to tourism in the area (Svaldi, 2021). Las Animas County is not a ski county. However, the area's desirable natural features including hiking, biking (mountain and gravel), camping, and hunting could create similar, regressive effects with respect to inequity and imbalances if the housing and labor market dynamics change in a way that adds economic stress to the lower income groups commonly providing the labor needed within tourism-focused sectors.

The reasons to evaluate the potential inequities in benefits is to inform alternatives to developing Fishers Peak State Park that more fully consider and frame analysis that:

- Embeds tourism infrastructure and development strategies that mitigate seasonality and encourages progressive employment models that would assure better outcomes for those lower income households who will be the workforce to support growth
- Allows for a higher share of local capture of new economic activity through business, market and promotional development programs focused on households and entrepreneurs already in the region
- maximize labor or local entrepreneur welfare
- minimizes the probability of regressive impacts to income for more traditional models that simply provide low-income service jobs that are not able to support households in amenity rich areas that commonly experience elevated housing demand

An input-output model should be sufficient to accurately estimate the regional effect of Fishers Peak State Park using aggregated industry data from IMPLAN (Cline & Seidl, 2011). The specific outcome of interest is the change in income of a representative household in the lowest quintile of income. If their income goes up, then the addition of Fishers Peak State Park will not require any additional policy interventions. If bottom-quintile household income remains steady or goes down, then either focused development alternatives or policy interventions will be necessary to ensure positive welfare outcomes across the distribution of incomes in the city of Trinidad and Las Animas County, CO. An overview of the region and present household characteristics in the area will be discussed in the next section.

2.2 Literature Review

In terms of regional modeling alternatives, an input-output analysis using IMPLAN Cloud is an effective tool for conducting economic impact analysis (Cline & Seidl, 2010). IMPLAN's input-output analysis using the Leontief Production Function and propietery aggregated data is a critical resource in estimating the regional impact of tourism expenditures. While it would be more accurate to develop survey-based estimates for the local production function of Las Animas County, time and budget constraints are prevent such a methodology. As such, estimated expenditures and input-output analysis run through IMPLAN will suffice to estimate the effect of tourism (Orens & Seidl, 2009). Additionally, IMPLAN features occupation data in its analysis to estimate wage and salary employment and income which is of key importance in this paper. The alternative method of estimating the effect of Fisher Peak visitation expenditures through a computable general equilibrium (CGE) model would not offer any clear advantages over input-output analysis when assessing the effects related to outdoor recreation, but would increase modelling effort (Cline & Seidl, 2010).

Despite the negative outlook on certain aspects of tourism in Incera & Fernández (2015) and Marcouiller (2007), an important point in both articles is that inbound (non-local) tourism is a significant driver of medium-wage, self-employed or entrepreneurial businesses. The tourism sector provides many opportunities for entrepreneurial endeavours both for non-employer or employer establishment for those successful in tourism employment (Marcouiller, 2007). What are referred to as "Recreational Counties", are nonmetro counties with high amounts of recreational acitivities, tourism industries, and seasonal housing by the ERS (Reeder & Brown, 2005), have experienced much better outcomes than other non-metro counties (Davidova, Thomson, & Mishra, 2019). Recreational counties serve as prime locations for entrepreneurial activity given they are attractive locations with substantial natural, cultural, and/or social amenities. Subsequently, they provide entrepreneurs, commonly with start-ups related to tourism sectors, but also, across other sectors whose owners are attracted to the region seeking a fulfilling way of life (McGehee & Kim, 2004). Accordingly, recreational counties were found to have higher rates of economic growth, spurred by much stronger population growth and business diversification, than other rural counties (Davidova et al., 2019). However, opportunities in Recreation Counties can have significant economic leakages to large non-local businesses (such as franchise hotel, restaurant, and retailers) where the positive effects of tourism expenditure aren't captured locally (Reeder & Brown, 2005).

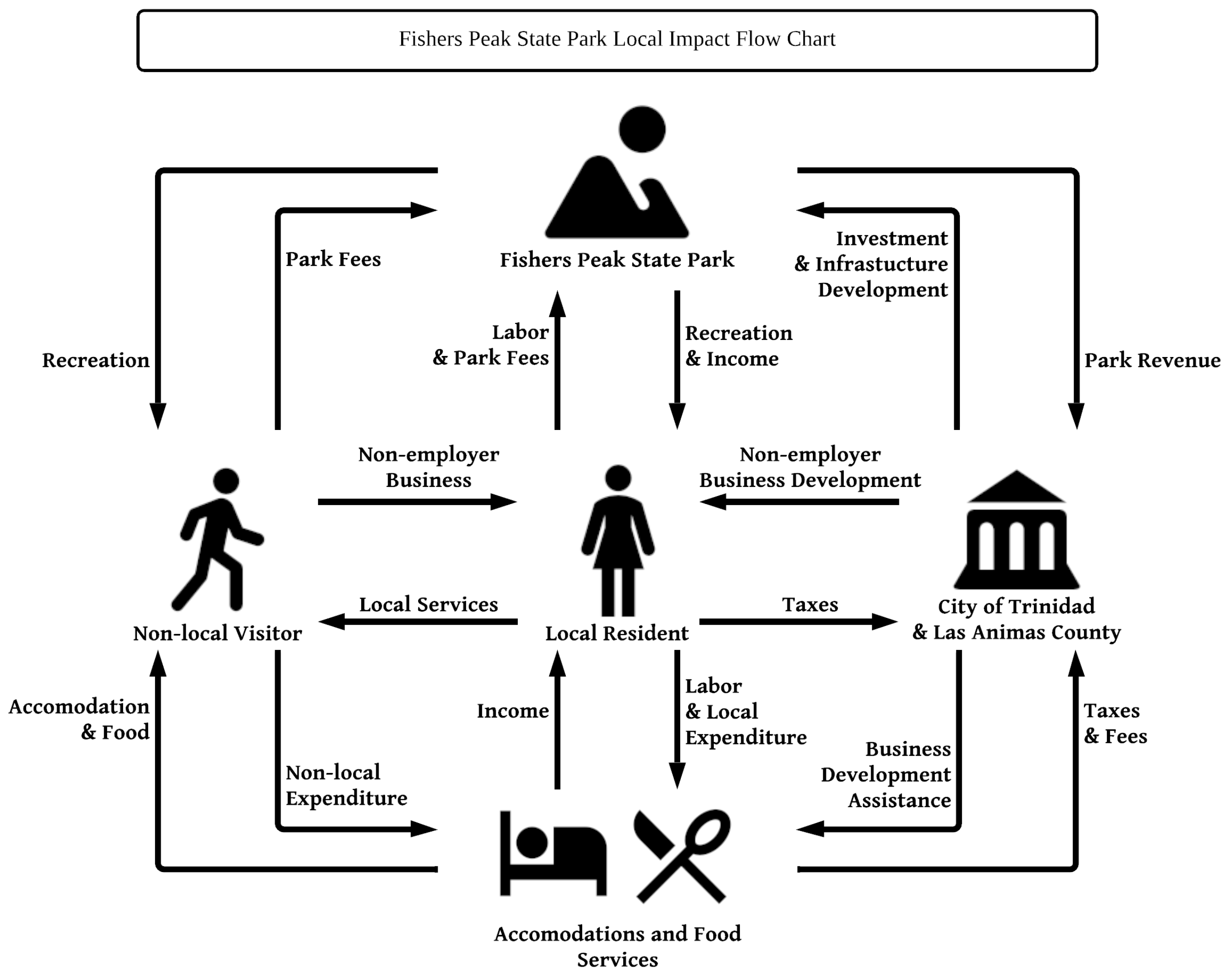
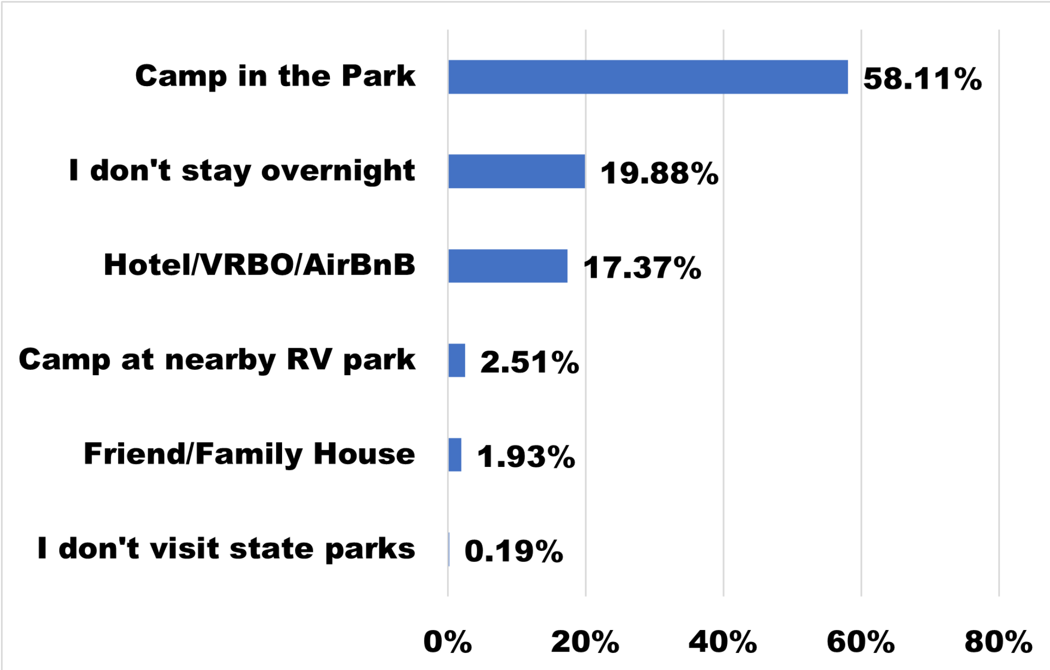


Figure 2.1: Fishers Peak State Park Local Impact Flow Chart

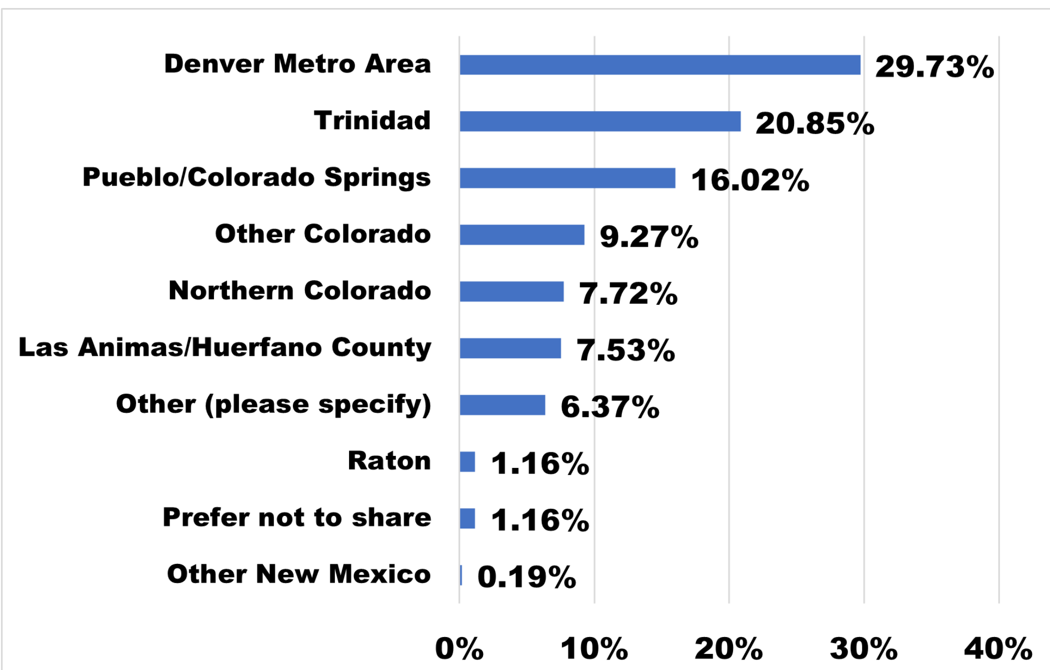
Therefore, it may be important to frame and implement tourism and business development programs or policies in Recreation Counties that support a fuller capture of economic activity related to tourism and, where possible, equitably distributes it to the local residents seeking economic mobility. Las Animas County and the City of Trinidad already have Trinidad Lake State Park, and with the addition of Fishers Peak State Park can capitalize on the opportunity to further establish themselves as a Recreation County. As stated above, there are significant advantages afforded to Recreation Counties over other areas (Reeder & Brown, 2005; Davidova et al., 2019). For example, literature informs us that Trinidad and Las Animas County can improve outcomes for low-income households if they focus on creating initiatives that incentivize local entrepreneurship of non-employer establishments. As one example, there has been increasing attention to support for agritourism operations that leverage underutilized agricultural lands and assets in rural areas adjacent to natural resource amenities, that provide diversified economic opportunities for farms as well as support for the small to medium sized employer establishments that are created from non-local agritourism expenditure (Pender et al., 2012; Van Sandt, Low, & Thilmany, 2018; Gascoigne, Sullins, & Thilmany, 2008).

Tourism expenditures from non-local visitors adds to the local economy whereas local expenditures from in-region households just recirculates money that was already in the system. This relationship is shown in the circular flow diagram in Figure 1. Preliminary stake-holder engagement yielded an engagement survey that revealed some of the typical traits of potential Fishers Peak visitors including demographics, interests, and location of residence to disaggregate local from non-local spending (Master Plan, 2022). The survey found that 69.11% of respondents were non-local with, 29.73% being from the Denver Metro specifically. Additionally, respondents preferred to camp overnight, participate in trail or nature-based events, and commonly planning to visit with a partner/spouse/friends. Respondent preferences for accommodation when visiting for state parks away from home are shown in Figure 2.2a. Respondent residence shares are shown in Figure 2.2b. [1]

[1] Figure 2.2 are courtesy of the FPSP Master Plan Team.



(a) When visiting a state park away from home, and you plan on staying overnight are you most likely to: (Select One)



(b) Do you reside in: (Select One)

Figure 2.2: Fisher Peak Master Plan Survey Questions

Estimation of tourism expenditures for state parks has limited literature relative to other types of tourism. In Oh and Schuett (2010), the authors explore expenditures amongst rural tourism visitors for recreational fishing in West Virginia in two distinct groups: overnight visitors and day trip excursionists. Oh and Schuett (2010) find that in their study, even though overnight visitors represented 40% of tourist dollars spent, they were only 12.4% of total visitors. This indicates that overnight visitors, who are generally families that are traveling for relaxation and family-time, will have a significantly greater impact in terms of total expenditures (Oh & Schuett, 2010). Additionally, while overnight visitors spend more in total than day-trip visitors, both groups spend a similar proportion on food (28% of total costs) and gas (15-19% of total costs) (Oh & Schuett, 2010). Oh and Schuett (2010) found day-trip visitors spend roughly $18.88 on meals, $13.19 on gas, and $68.03 total, while overnight visitors spend $79.23 on meals, $41.00 on gas, and $281.25 total. Palacios and Caneday (2014) conducted a study on Oklahoma State Parks and estimated a mean per person expenditure of $178 with 75% of visitors spending at least two nights. As a part of the analysis for Fishers Peak State Park Master Planning, TPL (2020) estimated that the minimum expenditure per person would be $85, but a more reasonable estimate was $164 for local visitors and $288 for non-local visitors, based on the literature.

The literature analyzing the impacts of non-local expenditures on income-distribution related to increased tourism activity has discovered heterogeneous results depending on the sample. The agritourism [2] literature finds that expenditure improves outcomes in rural areas (Davidova et al., 2019). Outdoor recreation visitors drawn to Fishers Peak State Park likely provide agritourism opportunities to diversify the local economy (Davidova et al., 2019), making it less prone to rapid fluctuations in the market typically attributed to rural economies dependent on more traditional agriculture and natural resource extraction (Reeder & Brown, 2005). When looking at total effects, agritourism was previously estimated to account for 7% (14,655) of all tourism jobs in Colorado, with non-local visitors creating 80% of agritourism expenditures (Thilmany, Sullins, & Ansteth,

[2] agricultural tourism: any income-generating activity conducted on a working farm or ranch for the enjoyment and education of visitors (UCDANR, 2017)

2007). Moreover, agritourism may allow existing legacy enterprises to leverage their community capitals and capture more returns to underutilized assets (Pender et al., 2012).

However, an important distinction is that existing agritourism literature has been primarily focused on measuring the impacts to revenue and diversification for farm and ranch operators and less on the distributional effects on local workers, specifically low-income households. This “reality check” is exemplified by the "stunted" quality of jobs generated by tourism (Marcouiller, 2007; Incera & Fernández, 2015). Tourism jobs and employment are primarily characterized as highly seasonal, entry-level, and part-time positions (Marcouiller, 2007; Davidova et al., 2019; Reeder & Brown, 2005). This can lead to regressive effects on low-income households. Tourism literature based on a study of the Galicia region in Spain, finds that expenditure from non-local visitors contributes more to the high-income households than to low-income households (Incera & Fernández, 2015). This is why it is important to consider the distributional effects when evaluating policy decisions and economic development initiatives related to tourism assets and investments.

2.3 Methodology

As stated previously, an input-output model will be used to estimate the total captured effect of tourism visitation expenditure to Fishers Peak State Park. Total visitation expenditure will be comprised of three factors: visitation, expenditure, and the percentage of visitors who are non-local. Visitation will be estimated based on models developed by Weiler (2006) and Weiler (2006), who looked at the effect of a national park designation in addition to park acres, total national park visitors, and the population of the state. How the model is modified for this site will be discussed later in the empirical model section.

For estimates on park expenditure per-visitor, we will use TPL estimates for expected expenditures per visitor (Schuck & Rudd, 2022). We will focus on the percentage of total visitors that will be non-local, as we are interested in the expenditures that are adding to the regional economy (rather than shifting expenditures by local households from one business activity to another). TPL estimated between 54-87% of visitors will be non-local, and this is consistent with a survey conducted by Florida State Parks estimating that 74% of all park visitors to state parks are non-local (Scruggs, 2014). Based on this and the survey data from the Fisher Peak Master Plan Team, we will assume that 69.11% of visitors are non-local for this study(Master Plan, 2022).

The three measures of estimated visitation, per-visitor expenditure, and percent of non-local visitors will be multiplied together to obtain the estimate for total visitation expenditure. This estimate for total visitation expenditure will then be entered into an input-output model run through IMPLAN in the Las Animas County region as a change to final demand in an aggregated tourism sector. The aggregated tourism sector will include the following IMPLAN 546 code industries:

- Other amusement and recreation industries (504)
- Full-service restaurants (509)
- Limited-service restaurants (510)
- All other food and drinking places (511)
- Hotels and motels (507)
- Other accommodations (508)
- Retail - food and beverage stores (406)
- Retail – gasoline stores (408)

The output will represent the estimated total impacts to economic activity in industry output and industry occupational employment and income as a result of tourism visitation expenditures. The lowest quintile of household incomes in Las Animas County will be compared ex-ante and ex-post, and the difference between the two will be the estimated distributional impact. Due to a lack of data, when estimating input-output analysis, the average expenditure per visitor will be distributed amongst the industries listed above using the values listed in Table 2.1.

Ideally, the effect of the addition of Fishers Peak will cause the changes to labor supply by industry from an increase in demand created by increased Fishers Peak visitation. Tourism expenditures will change demand for restaurants, hotels, and other businesses related to the state park.

As such, we would expect there will be a change in the industry concentration based on changes in final demand and should allow for a net positive benefit to total wages.

An additional factor in the analysis is the consideration of whether the visitation to Fishers Peak State Park is complementary or substitute with respect to visitation to other State Parks in the area, such as Trinidad Lake, and the broader Colorado State Park system. Fishers Peak's location along the I-25 corridor lessens transportation related capacity constrains. Also, Fishers Peak offers complementary activities and amenities to Trinidad Lake. Both parks feature camping, hiking, and mountain biking features. However, Fishers Peak primary features are hiking and mountain biking trails while the primary activities of Trinidad Lake are boating and fishing. The analysis assumes that the visitation to Fishers Peak State Park is complementary.

2.4 Data

The most important data for this analysis will be sourced from IMPLAN for the Social Accounting Matrix (SAM) used in the input-output model. The most up to date SAM that is available to download, and use is the 2019 estimates for Las Animas County. All other significant portions of data come from other national and regional sources from the Census American Community Survey (ACS) and Colorado Parks and Wildlife (CPW).

Estimates for visitation will utilize data from ACS and CPW Monthly Park Visitation Reports. Based on the literature review, a realistic estimate for per visitor expenditure is $281(Palacios & Caneday, 2014; TPL, 2020; Oh & Schuett, 2010). Table 2.1 below describes the assumed distribution of tourism expenditures which is also based on the literature related to the distribution of expenditures shared in the literature (Oh & Schuett, 2010).

Table 2.1: Assumed Per Visitor Expenses

Item	Cost
Meals	$80.00
Gas	$41.00
Recreation Fees	$55.70
Accommodations	$105.00

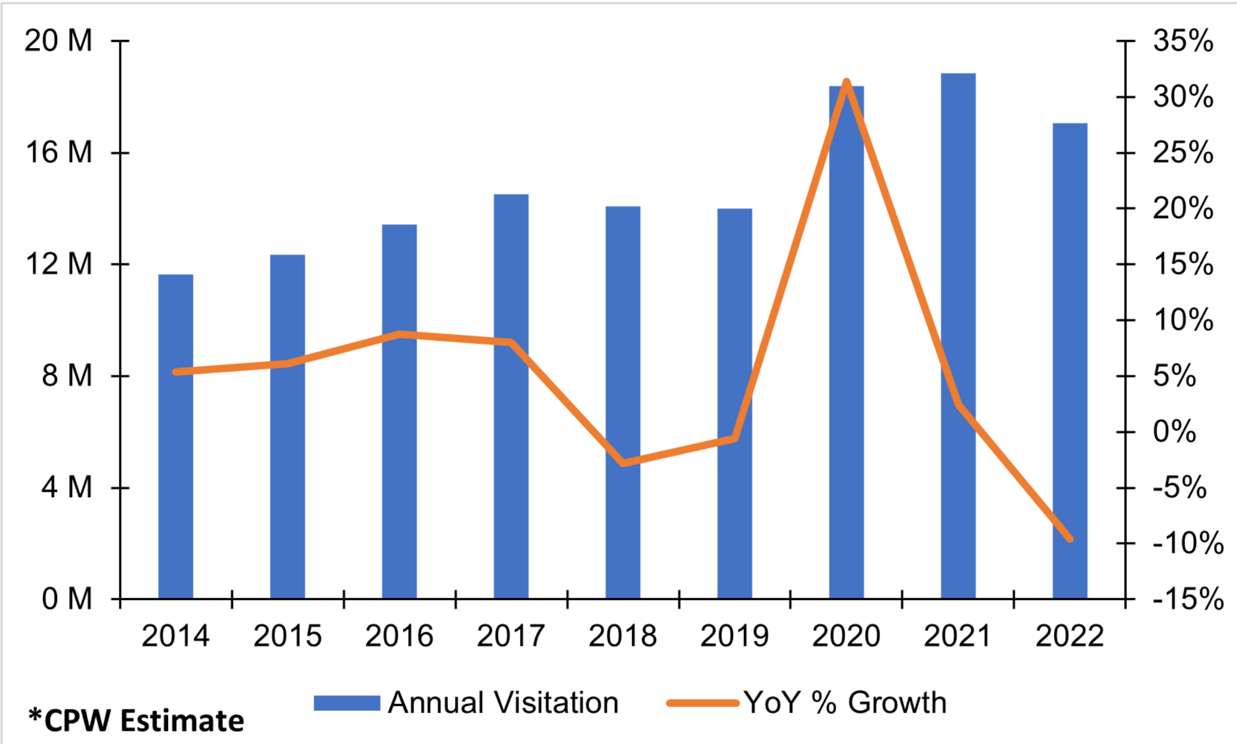


Figure 2.3: Total Annual State Park Visitation (Millions), Colorado

The monthly visitation data for all of Colorado State Parks is courtesy of CPW Statewide Public Information Officer, Joseph Livingston. The data contains number of monthly visitors to state parks from January 2013 to December 2022. However, due to incomplete or irregular data, the following state parks are omitted from the dataset: Arkansas Headwaters, Fishers Peak, Lone Mesa, and San Luis. Figure 2.3 displays annual trends and growth to visitation to parks included in the analysis from 2014-2022[3]. For estimating visitation, a critical element is knowing the population and income of the area where the park is located (Weiler, 2006). We will use a transformation of county level-data from ACS[4] 5-year estimate of the number of households and household median income for the area around the given state park (Census, n.d.-b). The transformation will be discussed further in the next section.

[3]2013 is included in the sample but is not in Figure 2.3 because there wasn't data available to estimate an annual growth rate prior to that year, so it simply serves as a base for 2014.

[4]American Community Survey. Data source: Subject Table S1903

Park acreage is a key determinant in estimating visitation. Data on state park acreage comes from the Colorado Parks and Wildlife (2022). In CPW's 2022 Colorado State Recreation Lands Brochure they state the acreage for every state park in Colorado, including the number of land acres and water acres each park contains (Brochure, 2022). The total area of the 42 state parks in the study is equal to 204,428 acres, with 159,559 land acres and 44,869 water acres (Brochure, 2022). Previous visitation data for parks included in this analysis comes from the Colorado Department of Natural Resources, Division of Parks and Wildlife Financial Report. Additional data to account for the number of households and household income in the counties the park resides will be compiled from county level-data from ACS for the number of households and household median income for the area around the given state park (Census, n.d.-a). The data transformation steps will be discussed in the next section. In order to create comparable time-series datasets using the ACS 5-year estimates and CPW data, we must use non-overlapping samples. For the purposes of estimation, there will be four separate sample periods for the data:

- 2013 and 2018
- 2014 and 2019
- 2015 and 2020
- 2016 and 2021

Descriptive statistics are summarized in Table 2.2 and Table 2.3. Table 2.2 is the descriptive statistics for one of the sample with the 2016 and 2021 data. The other three samples have very similar descriptive statistics and are listed in Appendix C. The data from Table 2.3 is the logged descriptive statistics for the 2016 and 2021 data sample used in the analysis. Additionally, having pairwise samples from 2013 to 2021 allows us to discern COVID impacted results from Non-COVID impacted results.

To estimate the effect on the distribution of income in Las Animas County, we must first obtain a baseline estimate. Using the S0701 dataset from the ACS, we can obtain estimates for relative income level distribution. The distribution is shown in Figure 2.4.

When conducting input-output analysis, IMPLAN estimates additional employment by occupation type and the wages and salary associated with that employment. The average wages from these estimates can be used to bin the employment to match the income levels in the ACS S0701

Table 2.2: Descriptive Statistics: Example Sample (2016 & 2021)

Statistic	N	Mean	St. Dev.	Min	Max
Visitation	84	384,304	661,404	26,723	4,687,369
State Park Acres	84	4,867	11,038	35	71,194
Park Acres, Land	84	3,799	10,894	20	71,024
Park Acres, Water	84	1,068	2,005	0	11,749
Agg. Weighted Income	84	67,048	18,622	33,257	127,443
Agg. County Households	84	72,018	86,522	1,720	364,420

Table 2.3: Logged Descriptive Statistics: Example Sample (2016 & 2021)

Statistic	N	Mean	St. Dev.	Min	Max
ln (*Annual visitation*)	84	12.241	0.995	10.193	15.360
ln (*State Park Acres*)	84	7.475	1.534	3.555	11.173
ln (*Park Acres, Land*)	84	7.003	1.606	2.996	11.171
Park Acres, Water*	84	1,068.3	2,005.0	0	11,749
ln (*Agg. Weighted Income*)	84	11.077	0.271	10.412	11.755
ln (*Agg.County Households*)	84	10.341	1.425	7.450	12.806

**Not logged because there*

** are values equal to zero.*

dataset. We can then analyze the changes to the different levels to understand the changes to the distribution. Additionally, we can attach a rank with each income level with 1 as the lowest level, and 8 as the highest level. Then we can use these rankings to calculate the quintile ranks. The baseline quintile ranks are in Table 2.5. For additional clarity, Table 2.4 is included to map income level ranks listed in the quintile tables to the corresponding income level ranges listed in the graphs.

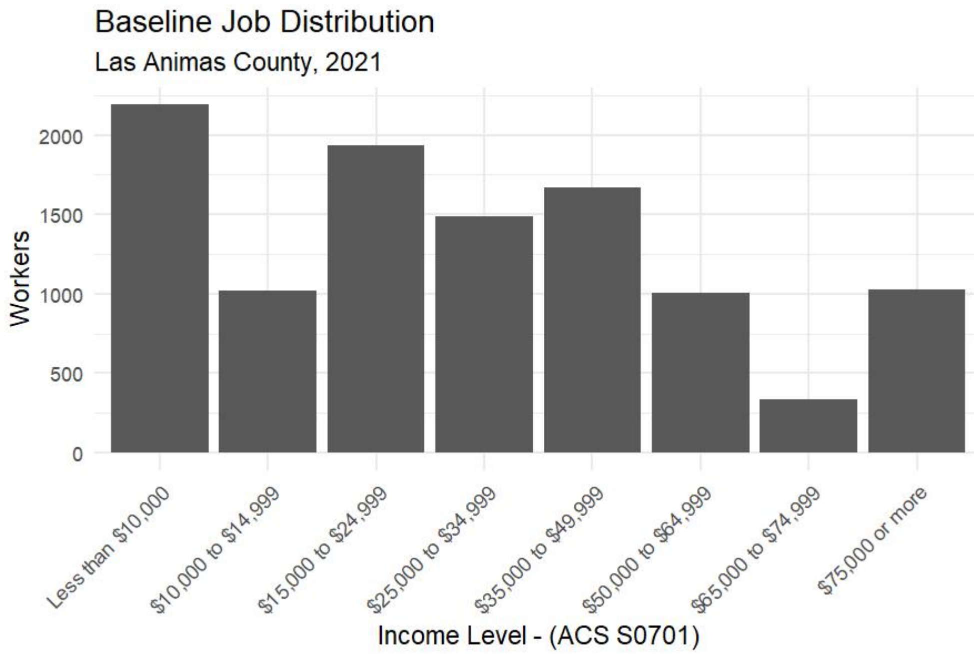


Figure 2.4: Baseline Income Range Distribution

Table 2.4: Income Level Range to Rank Map

Income Level: Range	Income Level Rank
Less Than $10,000	1
$10,000 to $14,999	2
$15,000 to $24,999	3
$25,000 to $34,999	4
$35,000 to $49,999	5
$50,000 to $64,999	6
$65,000 to $74,999	7
$75,000 or more	8

Table 2.5: Baseline Income Rank Quintiles

1^{st} Quint.	2^{nd} Quint.	3^{rd} Quint.	4^{th} Quint	Min	Max	Avg
1	3	4	6	1	8	3.834

2.5 Empirical Model

The estimation of park visitation is based on a slight modification of two similar national park visitation regression models from Weiler (2006) and Weiler & Seidl (2004). The chosen modified regression model [A] is:

$$\ln(V_{it}) = \beta_0 + \beta_1 \ln(StateParkAcres_i) + \beta_2 \ln(AggCountyHouseholds_{it}) + \beta_3 \ln(AggWeightedIncome_{it}) + \epsilon_{it}$$

with the error term assumed to be an independent, normally distributed random variable with mean zero and variance σ_μ^2. The model estimates the visitation V_{it} at park i in time t. The variable StateParkAcres is the total acres of the *ith* state park. *AggCountyHouseholds* and *AggWeightedIncome* are the Aggregated County Households and Aggregated and Weighted County Income. Both metrics consider the number of households and median income of all counties which the park resides in, either one or multiple, from the ACS 5-year estimates. This is in an effort to control for the potential concentrations with nearby populations and their income.

Aggregated County Households simply adds together all households for counties which the ith park resides in. Aggregated and Weighted County Income takes the weighted average of median income for counties which the park resides in and is weighted on households. For example, Staunton State Park is divided between both Park County and Jefferson County. For the 2019 ACS 5-year estimates, Park County had 6,931 households and median income of $73,622 and Jefferson County had 232,284 households a median income of $82,986. Thus, for Staunton State Park in 2019, the aggregated county households in the adjacent area is equal to 239,215 with a weighted median income of $82,714. The list of State Park County residences is listed in Appendix B. These variables are modified to match state parks, rather than national parks in the original model (Weiler & Seidl, 2004; Weiler, 2006). All variables are logged to control for heteroskedasticity in the variables.

Additional specifications have been included to account for variation within Park Acres between area and the differences between land and water area. The usage of one land acre is likely different than one water acre. To account for these potential variations in area type valuations, we have identified the following model variations:

$$[\text{ B }]: \ln(V_{it}) = \beta_0 + \beta_1 \ln(StateParkAcres_{i,Land}) + \beta_2 StateParkAcres_{i,Water} + \beta_3 \ln(AggCountyHouseholds_{it}) + \beta_4 \ln(AggWeightedIncome_{it}) + \epsilon_{it}$$

$$[\text{ C }]: \ \ln(V_{it}) = \beta_0 + \beta_1 \ln(StateParkAcres_{i,Land}) + \beta_2 PercentAcres_{i,Water} +$$
$$\beta_3 \ln(AggCountyHouseholds_{it}) + \beta_4 \ln(AggWeightedIncome_{it}) + \epsilon_{it}$$

As stated in the data section, $ParkAcres_{i,Land}$ and $ParkAcres_{i,Water}$ sum to equal *State Park Acres*. $PercentAcres_{i,Water}$ is equal to:

$$\frac{\textit{ParkAcres}_{i,Water}}{\textit{State Park Acres}_i}$$

There are additional models in Appendix D that include Year fixed effects and State Park fixed effects in Appendix E. However, the only statistically significant year fixed effect is for 2020, as would be expected given COVID disruptions. Since the inclusion of fixed effects has minimal changes to coefficient estimates in all models and sample periods, we stay with the initial, streamlined models.

2.6 Analysis

In this section we will analyze the results from estimating state park visitation, input-output analysis from state park visitation expenditure, and the distributional effects to household income.

2.6.1 Visitation Estimates

Using the model specified in the previous section and data from the Census ACS and CPW, we are able to estimate state park visitation across our four samples of two-year comparisons in 42 different state parks. The regression results are listed in Table 2.6 . Three specifications are defined and modeled using all four sample periods. For clarity the models are grouped by model specification and ascend in samples years from left to right for comparison of coefficient estimates. Model specification [A] defines the results for the primary model detailed in the previous section. For each model, fixed effects models were run but did not yield significantly different results but are listed in Appendix D and represent a robustness check of this model.

Table 2.6: Regression Results

	Dependent variable: ln (Annual Visitation)											
Start, Sample Year	(2013)	(2014)	(2015)	(2016)	(2013)	(2014)	(2015)	(2016)	(2013)	(2014)	(2015)	(2016)
End, Sample Year	(2018)	(2019)	(2020)	(2021)	(2018)	(2019)	(2020)	(2021)	(2018)	(2019)	(2020)	(2021)
Model Specification	[A]				[B]				[C]			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln (*State Park Acres*)	0.279^{***}	0.267^{***}	0.285^{***}	0.294^{***}								
$\ln(StateParkAcres_{i,Land})$					0.190^{***}	0.173^{***}	0.174^{***}	0.176^{***}	0.284^{***}	0.271^{***}	0.288^{***}	0.295^{***}
$StateParkAcres_{i,Water}$					0.0002^{***}	0.0002^{***}	0.0002^{***}	0.0002^{***}				
$PercentAcres_{i,Water}$									0.797^{*}	0.837^{**}	1.029^{**}	0.937^{**}
ln (*Agg. Weighted Income*)	−0.118	−0.035	0.158	−0.029	0.139	0.244	0.464	0.311	−0.031	0.063	0.297	0.076
ln (*Agg.County Households*)	0.331^{***}	0.303^{***}	0.255^{***}	0.257^{***}	0.376^{***}	0.349^{***}	0.311^{***}	0.319^{***}	0.346^{***}	0.321^{***}	0.280^{***}	0.277^{***}
Constant	7.772^{*}	7.301^{*}	5.728	7.715^{*}	5.078	4.373	2.492	4.037	6.525	5.886	3.734	6.176
Observations	84	84	84	84	84	84	84	84	84	84	84	84
R^2	0.378	0.381	0.373	0.363	0.420	0.429	0.436	0.452	0.382	0.386	0.384	0.367
Adjusted R^2	0.355	0.357	0.350	0.339	0.391	0.400	0.407	0.424	0.351	0.355	0.353	0.335
Residual Std. Error	0.842	0.795	0.797	0.809	0.818	0.768	0.761	0.755	0.845	0.796	0.795	0.812
F Statistic	16.198^{***}	16.394^{***}	15.868^{***}	15.181^{***}	14.316^{***}	14.841^{***}	15.239^{***}	16.298^{***}	12.214^{***}	12.412^{***}	12.330^{***}	11.433^{***}

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

From the results derived in our primary model specification [A], we find state park acres and the aggregated county households are key determinants in estimating state park visitation in Colorado, and are significant at the 1% level. For the most recent sample data (2016 and 2021), a 1% increase in state parks acres yields an increase of 0.294% to state park visitation on average, ceteris paribus. A 1% increase in the number of households in counties which the park resides in yields an increase of 0.257% to state park visitation on average, ceteris paribus. The weighted median income of households in counties which the park resides in is not found to be statistically significant in any model sample period. However, income is still important to include in the model estimates to control for variations among household preferences. Acres in a state park is found to be a good proxy for outdoor attractiveness and provides a simple framework for this model to be replicated in the future.

From the results on our secondary model specification [B], we find state land park acres, state park water acres, and the aggregated county households are key determinants in estimating state park visitation in Colorado, and are significant at the 1% level. For the most recent sample data (2016 and 2021), a 1% increase in state park land acres yields an increase of 0.175% to state park visitation on average, ceteris paribus. A 10,000 acre increase in state park water acres yields an increase of 2.0% to state park visitation on average, ceteris paribus. A 1% increase in the number of households in counties which the park resides in yields an increase of 0.257% to state park visitation on average, ceteris paribus. Consistent with [A], the weighted median income of households in counties which the park resides in is not found to be statistically significant in any model sample period.

From the results on our tertiary model specification [C], we find state land park acres and the aggregated county households are key determinants in estimating state park visitation in Colorado, and are significant at the 1% level. For the most recent sample data (2016 and 2021), a 1% increase in state parks acres yields an increase of 0.294% to state park visitation on average, ceteris paribus. A 1% increase in the number of households in counties which the park resides in yields an increase of 0.257% to state park visitation on average, ceteris paribus. The weighted median income of

Table 2.7: Fishers Peak State Park Visitation Estimates

Model Specification	2013, 2018	2014, 2019	2015, 2020	2016, 2021	Specification Mean
[A]	191,759	204,289	258,938	**281,732**	234,180
[B]	124,691	127,485	147,019	148,519	136,928
[C]	165,569	170,766	199,914	226,768	190,754
Sample Mean	160,673	167,513	201,957	219,006	187,287

households in counties which the park resides in is not found to be statistically significant in any model sample period.

Results from the Table 2.6 model specifications can be used to estimate the number of annual visitors to Fishers Peak State Park, using data from the 2021 5-year ACS and CPW where the Park has 19,200 State Park Acres, 19,200 Land Acres, 0 Water Acres, 0% Water Acres, Median Income of $45,118, and 6,410 households. The results in Table 2.7 are in similar in layout to Table 2.6 and includes averages across specifications and sample periods.

From Table 2.7 we find that, according to our primary specification using the most recent data estimates, that Fishers Peak State Park will receive an estimated 281,732 visitors per year. To give some perspective, Trinidad Lake State Park, which is less than 5 miles away from Fishers Peak, received 215,401 visitors in 2022. As discussed in the methodology in Section 3.5, we can assume that 281,732 annual visitors to Fishers Peak would be feasible thanks to its proximity to the I-25 corridor and that visitation would be complementary to Trinidad Lake. In the next section, this estimate will be applied to perform an input-output analysis of Las Animas County to identify the total economic impact of the park.

2.6.2 Input-Output Analysis

Using the estimated regression model (4) in Table 2.6, we can estimate the annual number of state park visitors to Fishers Peak State Park. We can then multiply total annual visitation by assumed percentage of non-local visitors to determine total annual non-local visitation. We can then multiply total annual non-local visitation by our assumed expenditure per visitor to obtain the total estimated annual state park visitation expenditures. $\hat{V_{it}}$ is our estimated visitation, $\overline{\eta}$ is our given percentage of non-local visitors, and $\overline{\mu}$ is the given average expenditures:

$$NonLocalExpenditure = \hat{V_{it}} \times \overline{\eta} \times \overline{\mu}$$

In the previous section we estimated that the total number of visitors to Fishers Peak State Park will be an estimated 281,732 visitors per year. Given our assumed percentage of visitors that are non-local and average expenditure from Table 2.1 we find that:

$$NonLocalExpenditure = \hat{V_{it}} \times \overline{\eta} \times \overline{\mu}$$
$$NonLocalExpenditure = 281,732 \times 69.11\% \times \$281.00$$
$$NonLocalExpenditure = \$54,712,100$$

Table 2.8: Input-Output Analysis

Impact	Employment	Labor Income	Value Added	Output
1 - Direct	578.24	$18,447,837	$28,229,995	$46,476,246
2 - Indirect	71.33	$1,770,055	$2,889,992	$9,064,596
3 - Induced	48.95	$2,048,227	$4,352,370	$7,608,257
	698.52	$22,266,120	$35,472,358	$63,149,099

From our input-output analysis we find that Fishers Peak State Park will generate $63.15 million in total output from visitation expenditure. We also find that this expenditure is estimated to create 550 total new jobs. The composition of employment by occupation type is available in Appendix A. The composition of employment is what we need to calculate income level ranks for these positions as discussed in the methodology section. For evaluating the effect on the household income distribution, only occupations from the occupation impacts tab in IMPLAN with a employment number equal to or greater than 1 were used in the analysis. As such, the total amount of occupational employment (where an occupation's employment ≥ 1) is equal to 550 jobs. In the next subsection we discuss the analysis of changes to the income distribution from this enhanced economic activity related to Fishers Peak State Park.

2.6.3 Income Distribution Analysis

Recalling the methodology used to create the baseline income rank quintiles, these steps were completed again ex-post to find the change in income distribution. Total changes are shown in Figure 2.5, with the additions added onto the baseline in Figure 2.6. The ex-ante quintiles for income ranks in Las Animas County are listed in Table 2.9 and ex-post income rank quintiles are listed in Table 2.10. The difference before and after the addition of the fully-realized impact of Fishers Peak State Park are listed in Table 2.11.

Table 2.9: Ex-Ante Income Rank Quintiles

1^{st} Quint.	2^{nd} Quint.	3^{rd} Quint.	4^{th} Quint	Min	Max	Avg
1	3	4	6	1	8	3.834

Table 2.10: Ex-Post Income Rank Quintiles

1^{st} Quint.	2^{nd} Quint.	3^{rd} Quint.	4^{th} Quint	Min	Max	Avg
2	3	4	6	1	8	3.841

Table 2.11: Difference in Income Rank Quintiles

1^{st} Quint.	2^{nd} Quint.	3^{rd} Quint.	4^{th} Quint	Min	Max	Avg
1	0	0	0	0	0	0.007

We can see from the ex-post quintiles in Table 2.10 that the lowest quintile of households increased (driven by the additional employment) from the Less than \$10,000 income level to the \$10,000 to \$14,999 level. The average rank increased from a rank of 3.834 to 3.841. However, the average remains within the bounds of the \$15,000 to \$24,999 income level for Las Animas County.

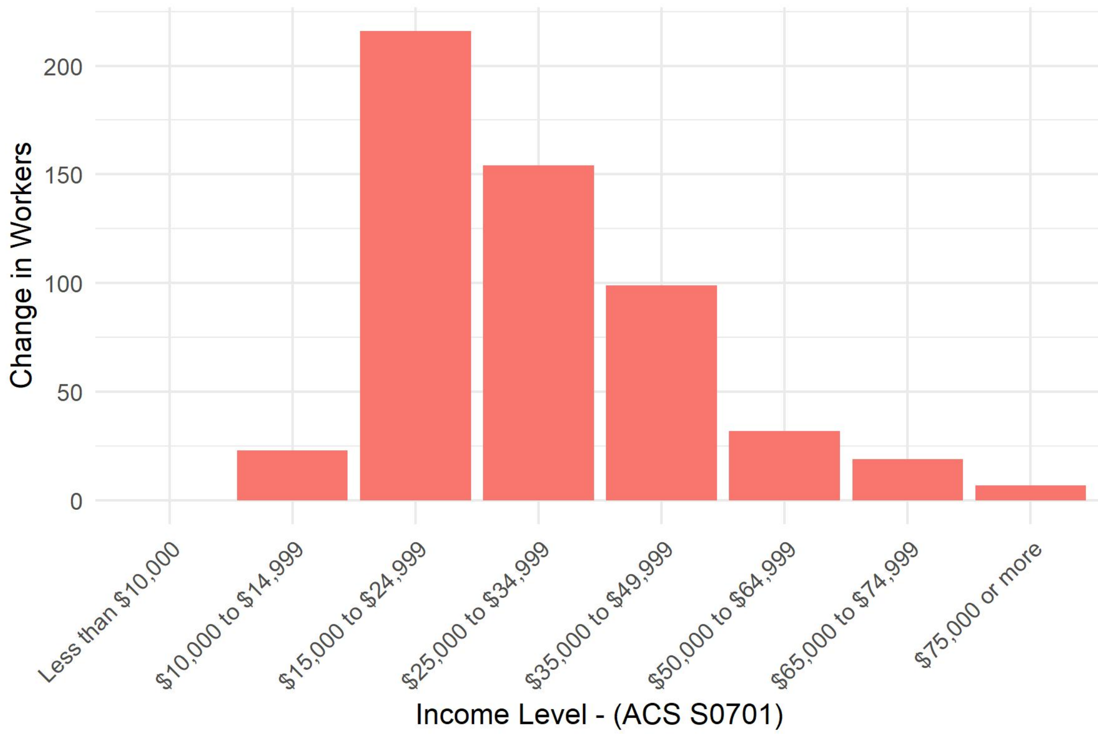


Figure 2.5: Estimated Jobs Added By Income Level, Las Animas County, 2021

From this analysis we find that the additional employment from visitation expenditure for Fishers Peak State Park increases the income rank of the lowest quintile in Las Animas County. This result shows that Fishers Peak State Park has a positive effect on the distributional income of Las Animas County with the addition of service-based jobs that support tourism. The implications and policy effects of this outcome will be discussed in the next section.

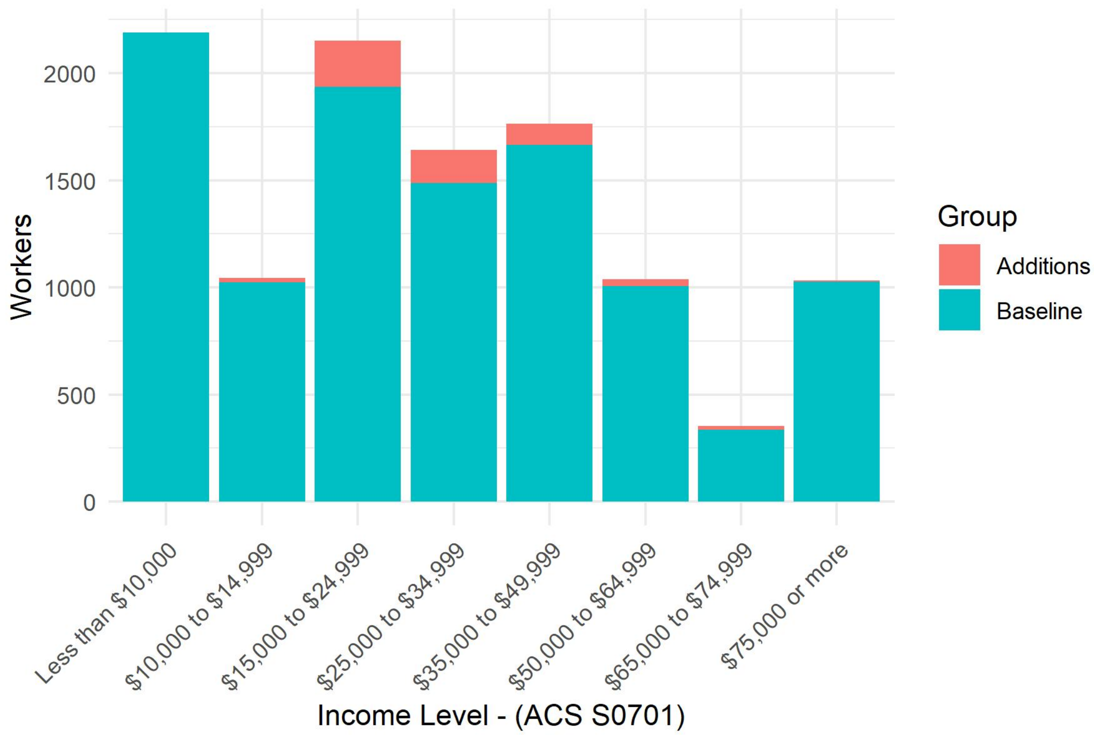


Figure 2.6: New Baseline Income Distribution By Income Level, Las Animas County, 2021

2.7 Discussion & Conclusion

Fishers Peak State Park has the potential to create many positive spillover effects to an area that could greatly benefit, but only if the broad set of potential economic and community outcomes are considered from the onset. The results of analysis can inform policy makers of potential impacts if no targeted programs or policies are framed, and perhaps, inform those leaders on how to focus their efforts and funding in those three areas to evaluate the outcomes for all households. In terms of relevant policy implications, this research has direct findings related to three main policy levers the community and case are considering: business development, housing affordability, and general welfare effects related to the park's development. If the analysis had concluded that household income for the lowest quintile falls with the addition of the park, then we would have recommended that policy makers should focus on workforce or business development to assist in creating entrepreneurial, business diversity or enterprise growth opportunities to raise household income. However, since analysis found that the park will have little effect on the income of the lowest quintile of households in Las Animas County, policy makers may be most impactful by focusing budget on housing and public projects that improve the welfare of residents with non-monetary mechanisms. Yet, there may still be opportunities to "grow" the impact with longer-term business development initiatives as the park is established.

2.8 Next Steps

Separate estimates for visitation and expenditures could be gathered through an up-to-date survey of current Trinidad tourists conducted with the assistance of the Trinidad Welcome Center. Additionally, the park recently announced its final master plan, which finalized the exact total and mix of park features including: hiking trails, mountain biking trails, equestrian trails, mixed-use trails, campgrounds, hunting seasons and areas, information centers, parking, and wildlife-exclusion zones. This information can be used to develop a survey to collect information about visitors' willingness to visit and willingness to spend if they do decide to visit to refine the estimates we made based on similar parks. More accurate willingness to visit information is crucial in estimating the mix of local vs. non-local visitors now that the park is established and visitation patterns are taking shape. As stated before, non-local visitation is more substantial because they are adding money into the economy, rather than shifting expenditures by local households from one business activity to another.

The public engagement survey conducted by the Fishers Peak State Park Master Plan Project Team to help guide planning in August 2021 revealed the demographics, interests, and residence of interested Fishers Peak visitors (Master Plan, 2022). However, no questions around expected expenditures or revealed preferences were asked at that time. Exposing the heterogeneity in visitor expenditure based on preference would aid in this analysis as it would allow for more detailed input-output models to be estimated. This would be useful as there could be a large contingent of pass-through/single-day visitors who stop at Fishers Peak as they're traveling along I-25, who haven't been apart of the Master Plan community engagement surveys.

The model specification utilized in this analysis allows for those planning and tracking the development of the park to estimate visitation to Fishers Peak State Park (or any State Park in Colorado) as the park rolls out new features. For example, the estimate of 281,732 assumes that Fishers Peak is fully open and all features are accessible. However, a park planner could still utilize the model specification in Section 2.6 to estimate visitation to a park when it's partially open and have a relatively accurate estimate.

An additional consideration not factored into this analysis would be the employment effect aligned with entrepreneurs and sole-proprietors starting or growing their businesses because of the addition of Fishers Peak State Park. These would certainly move the needle on employment added within the community and provide an important additional employment option for both local-residents and those looking to move to an area rich with new community assets and social capital.

Finally, an important consideration for additional employment within Las Animas County from Fishers Peak State Park is the need for additional infrastructure and housing needed to support these new jobs. A person, either local or non-local, must have access to housing and critical resources when they are ready to begin working in Las Animas as a result of Fishers Peak State Park for there to be long-term positive effects. Community planner within Las Animas County and Trinidad should work with organizations such of the OEDIT's[5] Colorado Tourism Office for additional resources and grant opportunities.

[5] Colorado's Office of Economic Development and International Trade

Chapter 3

Employment Resiliency from Tourism in Colorado

3.1 Introduction to Tourism Based Resiliency

Economic resiliency is an important metric to consider when analysing a community's overall economic bill of health. Being able to withstand recessionary shocks without losing a significant amount of employment can set up a local economy and community for long term success and well-being. The challenge faced by local parties is that improving resiliency requires a more holistic approach and investment within communities than individual enterprises can support, and rural areas that are commonly less economically diversified and dependent on primary industries may have unique challenges in addressing resiliency.

How resiliency is measured can significantly impact the outcome of analysis. Rural communities are acutely prone to significant employment loss in times of recession due to a variety of economic and socio-economic characteristics. Rural communities and their leaders seeking to more comprehensively evaluate infrastructure development options to help them strengthen key economic indicators that are keystones for economic resiliency require a more nuanced approach that is best fit for their residents. Rural areas have long faced an uphill battle mitigating the damage caused by economic downturns and a common driver is over-dependence on one primary economic sector. As one example of how communities can strategically address economic resiliency, major natural amenity sites such as state parks, and more specifically Fishers Peak, can potentially serve as catalysts for diversifying regional economic development and growth through tourism and the accompanying economic activity it may bring to the area.

However, a pitfall for communities to carefully avoid is enabling the development of a non-diversified economy overly dependent upon tourism (which may be even more challenging than dependence on the primary industries they hope to diversify from). As the regional literature has shown employment diversity is a strong indicator of economic resiliency (Watson & Deller, 2022), so this paper seeks to identify whether Fishers Peak State Park will add economic resiliency into the Las Animas County by looking at resiliency metrics in comparable areas before and after economic shocks such as the Great Recession and the COVID-19 Pandemic.

The analysis of economic resilience in comparable areas will utilize, update and customize the methodology identified in Watson & Deller (2022) to the specific project site of interest: Southern Colorado. Recently the literature has aimed to capture the effects of tourism and regional resiliency on a larger national scale (Watson & Deller, 2022).

In this paper we seek to apply the same tourism and hospitality dependency methodology from Watson & Deller (2022) through a more focused and applied lens by using refined location quotients for employment concentrations and data from the restricted QCEW, and also, comparing two different disruptions, the Great Recession (2007-2009) and COVID-19 Pandemic (2019-2021).

3.2 Tourism Based Resiliency in Colorado

The rationale behind a more focused look of community resiliency impacts from tourism industries came from a desire to provide Colorado communities with analysis and thought around how such an industry may contribute differential impacts across the state in times of economic turmoil. Specifically, but anecdotally, during the troughs of the pandemic, it was perceived that household recreational options were limited while adhering to COVID public health guidance, excepting outside activities to explore nature. However, this is exactly what was occurring in Colorado communities. Colorado State Parks in 2020 welcomed over 18.4 million visitors, a 31% increase in total visitation from 2019, and then experienced a further 2.5% growth in total visitation from 2020 to 2021 (CPW, 2023).

From casual observation, it was clear that there was intense tourism demand for the types of natural amenities that Colorado has to offer. The bigger question that we would like to tackle is analyzing whether Colorado reaped any notable positive benefits from their concentration of tourism and hospitality throughout the COVID pandemic and were able to be more resilient in the face of recessionary pressures. As an interesting comparison, this study also shares a historical look at how Colorado fared during the Great Recession.

From a more academic perspective, comparing and contrasting county employment resiliency with two distinct natural experiments in the COVID-19 Pandemic (2019-2021) and the Great Recession (2007-2009) can provide a useful benchmark for the communities useful to planning for future disruptions. While the Great Recession was a more prolonged economic recession that had negative impacts across all industries, the COVID Recession represented both an economic recession and social disruption. However, the COVID recession was much more localized and heterogeneous in its effects on industries throughout the economy where some experienced very negative effects, others neutral, and some even growing during the COVID-19 Pandemic.

3.3 Literature Review for Tourism Resiliency

The foundational resiliency metric and literture-informed basis for analysis for this chapter is based on the previous work completed by Han and Goetz (2015), Ringwood, Watson, and Lewin (2019), and Watson and Deller (2022) all which sought to create an employment resiliency metric that accurately measured an area's response to an economic shock from its observable local variation (Ringwood et al., 2019; Watson & Deller, 2022). However, before diving into specifics related to the employment resiliency literature we must explore the broader economic resiliency literature.

There is a widely-framed discussion on the definition of resilience and its intersection and distinction from near-terms of robustness and stability within the regional development literature (Watson & Deller, 2022). However, resiliency metrics generally fall within two categories. The first believe that there is one growth path that systems equilibrate to and follow, with resilience manifesting in a return to this growth path (Kitsos & Bishop, 2018). The second type is an ecology type belief that there are multiple equilibria within a given system, and resilience is measured in the force required to alter the system (Kitsos & Bishop, 2018). Thus, we accept the idea that, depending on methodology and assumptions, how one measures resiliency is subjective, and perhaps, related to the nature of the shock. The outcome of an economy being "deemed resilient" and outcome that occur are entirely based upon these assumptions. When estimating resiliency, we must acknowledge the potential shortcomings of the methodology. The metric and methodology used for analysis in this chapter follows the approaches from Watson and Deller (2022).

Watson and Deller (2022) sought to model how dependency on tourism and hospitality for economic activity influences the resiliency of the larger regional economy to an economic shock. They specifically looked at the 2007 - 2009 Great Recession at a county-based, national level, similar to the initial basis of the resiliency metric from Ringwood et al. (2019). This paper hopes to build on this, but in a more focused manner, by looking at both the 2007 - 2009 Great Recession and the 2019 - 2021 COVID-19 Pandemic for the state of Colorado.

This metric from Watson and Deller (2022) and Ringwood et al. (2019) is a suitable measure of economic resilience because it is uses an ecological definition of resiliency when estimating impacts to employment within a given county. Utilizing this framework and perspective allows the analysis to show how much force was required to change the system from it pre-shock trend, and then analyze the new growth path post-shock. Under the ecologically defined form of resiliency, there is a possibility for a more sustainable path with improved qualitative characteristics (Kitsos & Bishop, 2018).

To frame how the regional literature on resiliency relates to distributional effects discussed in the first chapter, one can consider how shocks force communities to consider how capacity building and sustainable development can improve both equity and resiliency in the long-term, and those strategies may be complementary. A regional economy is a system, and while employment is just a single component and doesn't capture the types of jobs people have, it allows us to measure the underlying impacts without distortion from lateral shifting as the system re-calibrates (Kitsos & Bishop, 2018). Especially when measuring resiliency during the COVID-19 Recession, where we saw many individuals reevaluating their own career paths and approach to work, it is particularly useful to assess whether or not they had employment opportunities that allowed their communities to remain resilient through the shock.

3.4 Data for Resiliency Modeling

The data for this section are compiled from public and restricted datasets. The employment data used to create the employment resiliency index (R) comes from county-level non-seasonalized monthly total employment data from the public Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics (BLS). At the time of writing, complete data for all counties in Colorado is available from January 2002 to June 2022. Employment data is then seasonalized using the Census Bureau's X-13 ARIMA through the seasonal package for R from the Comprehensive R Archive Network (CRAN), version 1.9.0, using the *seas()* function.

Data utilized to calculate the location quotients (LQ) and a Herfindahl Index for industry concentrations at the county level is derived from the restricted QCEW for 2007 and 2019, courtesy of the Colorado Department of Labor and Employment. This data includes firm-level responses for precise estimation. This data is also utilized in combination with the Internal Revenue Services (IRS) Exempt Organizations Business Master File Extract (EO BMF) to crosswalk and estimate the number of nonprofit organizations per 10k residents in a given county.

All other control variables in the analysis are derived from Census Bureau's American Community Survey (ACS) 5-year county estimates. The only exception is the data measuring religious organizations per 10k in population, which is only publicly available for the 2020 US Religion Census.

3.5 Methodology for Resiliency Score and Locations Quotients

3.5.1 Employment Resiliency Metric

Creating the employment recession resiliency score (R) follows methodology from Ringwood et al. (2019), which sought to quantify regional resilience through a two-dimensional measure that captured the depth and duration of a region's response to a shock by looking at changes in employment. The metric also accounts for underlying volatility to separate the response to the shock from random variation (Ringwood et al., 2019). Ringwood et al. (2019) applied the resiliency metric to county-level monthly employment to capture the response to the economic shock of the 2007-

2009 Great Recession. This paper seeks to build on this by also calculating the same metric for Colorado county's responses to the 2007-2009 Great Recession in addition to the 2020 COVID-19 Recession.

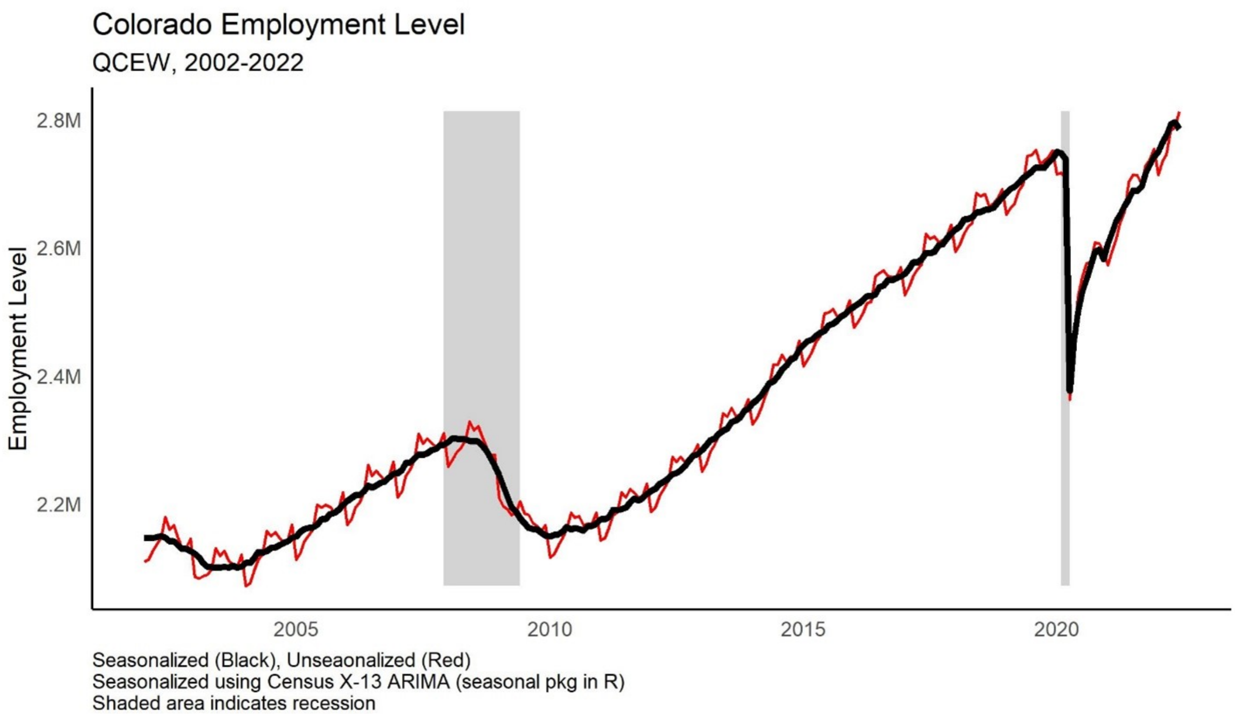


Figure 3.1: Colorado Seasonalized Employment Level

Following the methodology outlined by Ringwood et al. (2019), resilience is calculated based on total employment behavior during the months from a county's local peak, associated with the beginning of the shock response to six months after the trough to include the magnitude of the impact of the recession locally as compared to the beginning of the recovery. To identify the time frame for when employment peaks and troughs occurred, we first look to macro-trends at the state level. Figure 3.1 shows Colorado employment levels over the last two decades. At the state level, for the 2007-2009 Great Recession, Colorado had its employment peak in February 2008 and its employment trough in January 2010. For the 2020 COVID Recession, Colorado had its employment peak in January 2020 and its employment trough in April 2020. It is important to note that the employment behavior at the state-level Colorado is a close match to the national-level trends for the Great Recession and COVID-19 Recession. The National Bureau of Economic Research (NBER) defines the Great Recession as lasting from December 2007 through June 2009, and the COVID-19 Recession as lasting from February through April 2020. Using this combination of information, we will assume that the window for county-level peak employment in Colorado for the Great Recession ranged between December 2005 and December 2009, and for the COVID-19 Recession ranged between February 2018 and October 2020. For the Great Recession, the beginning date for the county-level employment peak range is identified as two years before and after the peak national employment level of December 2007 (Ringwood et al., 2019; Watson & Deller, 2022).

The date range for the county-level employment peak for the COVID-19 Recession will follow a modified methodology as compared to the Great Recession. The COVID-19 Recession had a more acute and localized impact to employment than the Great Recession in the United States in terms of duration. It is assumed that a county would not have experienced a downturn in employment caused by impacts from COVID-19 before December 2019. Additionally, because the window for impact from COVID was short-lived, we can safely assume that peak employment leading up to a COVID-19 Recession caused employment downturn would not have occurred after June 2020. Therefore, we define our search range for peak employment between December 2019 and June 2020.

The window for the employment trough caused by the recession is identified by finding the minimum employment level for a county with a date after the local employment peak, and then adding six months to capture the full effect of the county's resilience to the downturn. For the Great Recession, the range for a county's employment trough is between the peak employment date and December 2015. For the COVID-19 Recession, the range for a county's date employment trough is between the peak employment date and December 2021, because employment data for Colorado ends June 2022.

Once the window for actual employment behavior for a shock, the next step is to calculate the expected employment if the region had not deviated from the original growth path because of the shock (Ringwood et al., 2019). This is done by estimating a simple linear growth trend regression of employment leading up to the shock. For the Great Recession, the expected linear growth trend is calculated with data beginning in January 2002 up to the peak employment. For the COVID-19 Recession, the expected linear growth trend of employment is calculated with data beginning in January 2016. As an example, in Figure 1, we have plotted the employment growth trends leading to the Great Recession and COVID-19 Recession, represented by dotted and dashed lines respectively. The dark black line represents the actual employment level, seasonalized using the Census Bureau's X-13 ARIMA (Ringwood et al., 2019; Watson & Deller, 2022).

To identify the drop and duration of the shock, we calculate the area of deviation of actual employment below expected employment based on the pre-local recession trend during the specified time period following the start of the local recession, shaded in blue in Figure 3.1 (Ringwood et al., 2019; Watson & Deller, 2022). This application from Ringwood et. al (2019) follows the same methodology with the idea that a resilient economy will eventually return to its original growth path employment level.

As noted in the literature, this is not a perfect "one size fits all metric", as counties exhibit a wide variety of response behaviors to a shock (Ringwood et al., 2019; Watson & Deller, 2022). Counties with exceptionally high employment volatility like we saw with COVID-19 or places that experienced a double-dip, a short recovery followed by a drop into recession again, are slightly difficult to pin down with this metric (Han & Goetz, 2015; Ringwood et al., 2019). However, as it relates to the COVID-19 pandemic, fine tuning the criteria to identify the window for local response to shocks yields robust results for measuring resilience (Ringwood et al., 2019).

Before sharing the exact methodology, it is important to visualize that what we are measuring with this metric is highlighted in Figure 3.2. The area shaded in blue, between the dotted or dashed trend lines and the solid line, is the gross area between actual employment (solid) and the predicted trend (dotted/dashed). This gross area is meant to represent the depth and duration of the shock to employment from a recession. A county-level example of Las Animas County is detailed in Figure 3.3.

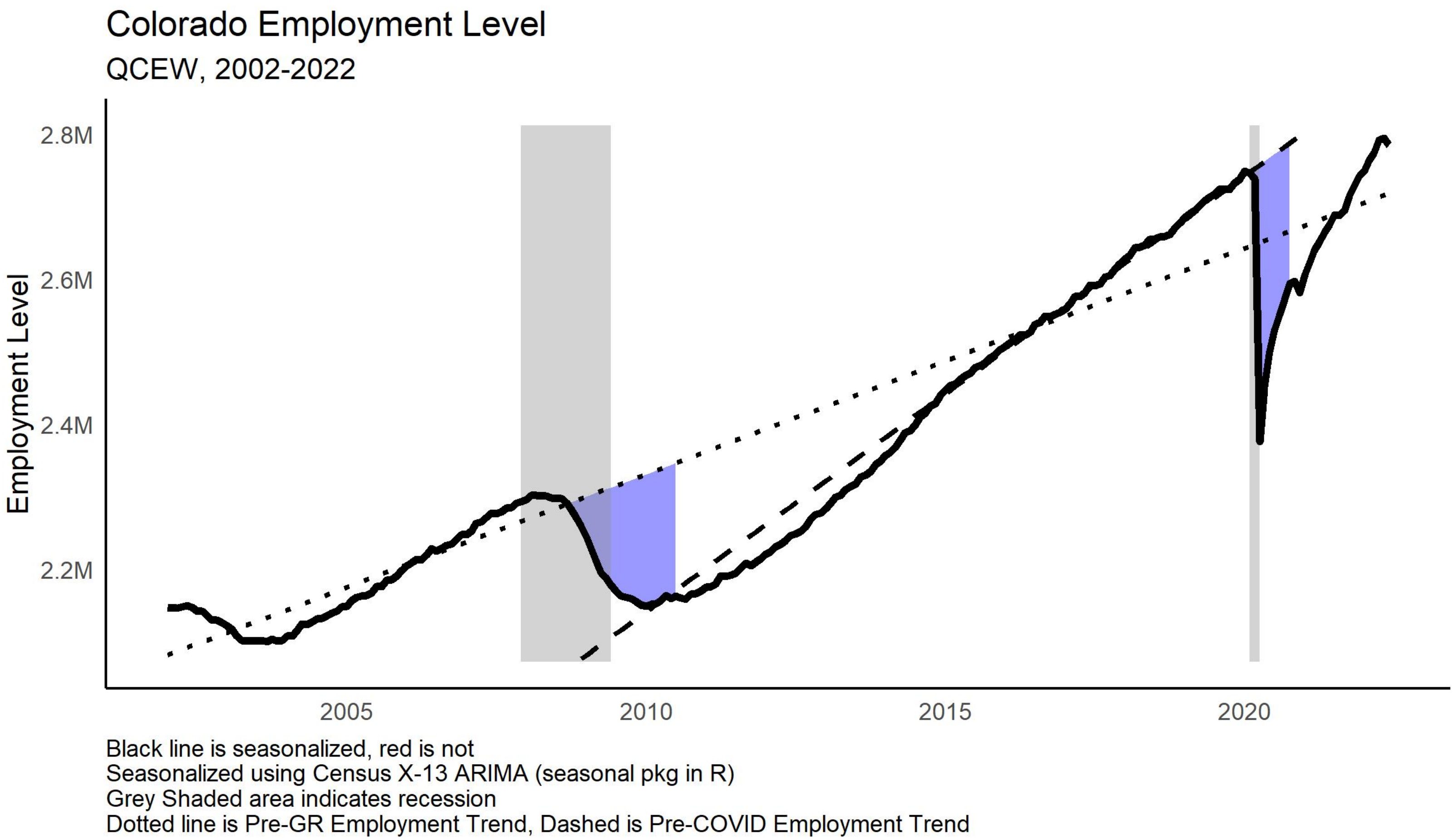


Figure 3.2: Example Employment Trend vs. Actual

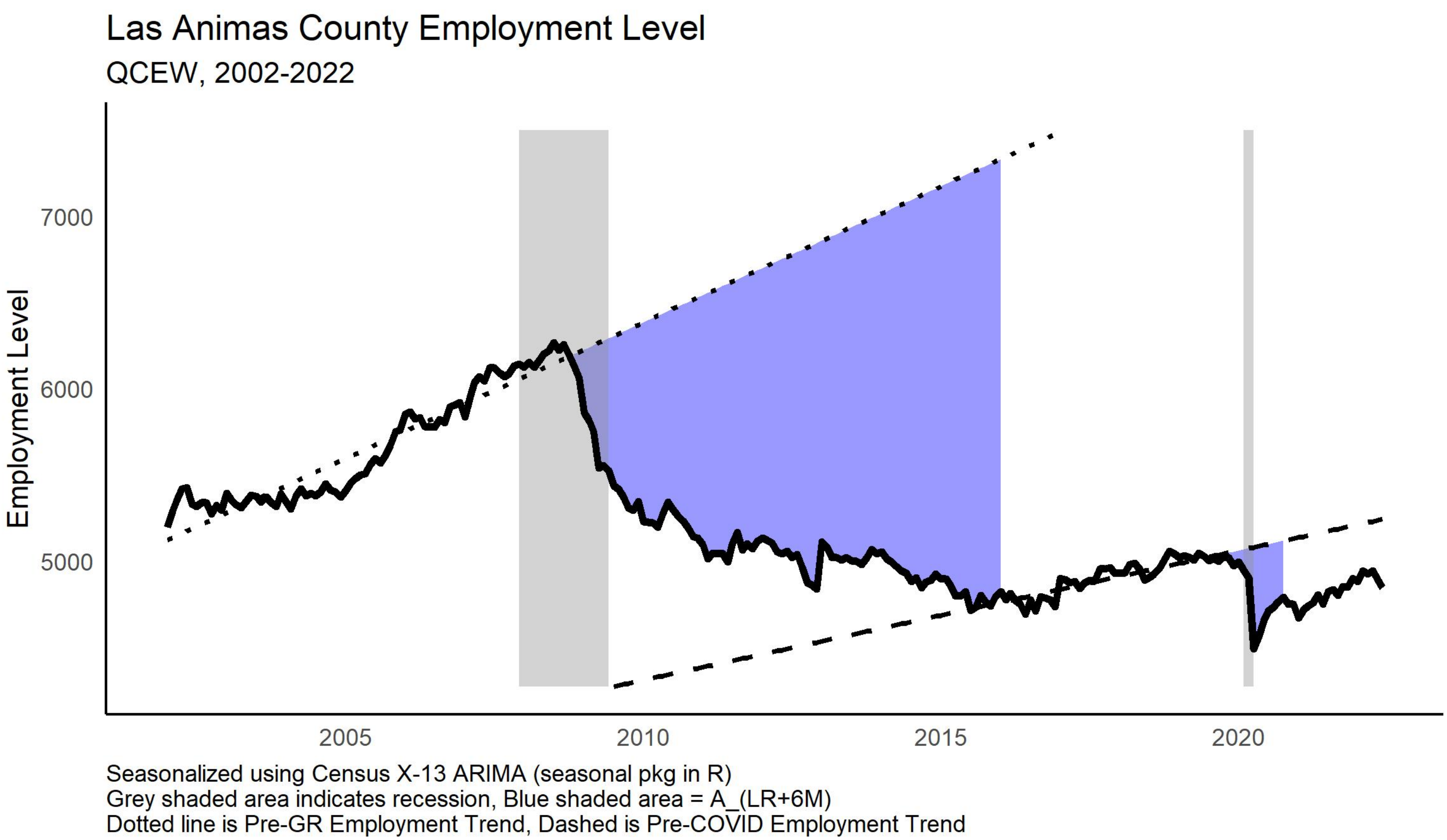


Figure 3.3: Las Animas County Employment Trend vs. Actual

Following the methodology outlined in Ringwood et al. (2019) and Watson & Deller (2022), the metric is resiliency metric R is calculated by the following formula:

$$R_{LR+6M} = \frac{(A_{LR+6M} - A_{EV})}{(Employment_{Peak})} \tag{3.1}$$

- A_{LR+6m} is the gross area between actual employment and employment trend from local peak to six months after trough.
- A_{EV} is the area of the expected variation across the length of the local recession plus six months.
- $Employment_{Peak}$ is a county's peak employment level leading up to the recession.

The gross area of response to the recession, A_{LR+6m}, is estimated use the following equation. In Figure 3.2 this area is shaded blue. This is equal to the sum of all individual month to month areas where actual employment was less than the pre-local recession trend from the month of employment peak (t_{LR_P}) to the month of employment trough plus six months (t_{lr+6m}).

$$A_{LR+6M} = \sum_{i=t_{LR_P}}^{t_{lr+6m}} A_i \textit{ where } A_i \begin{cases} \int_{t_{i-1}}^{i} E_{actual} - \int_{t_{i-1}}^{i} E_{trend} & A_i < 0 \\ 0, & A_i \geq 0 \end{cases} \tag{3.2}$$

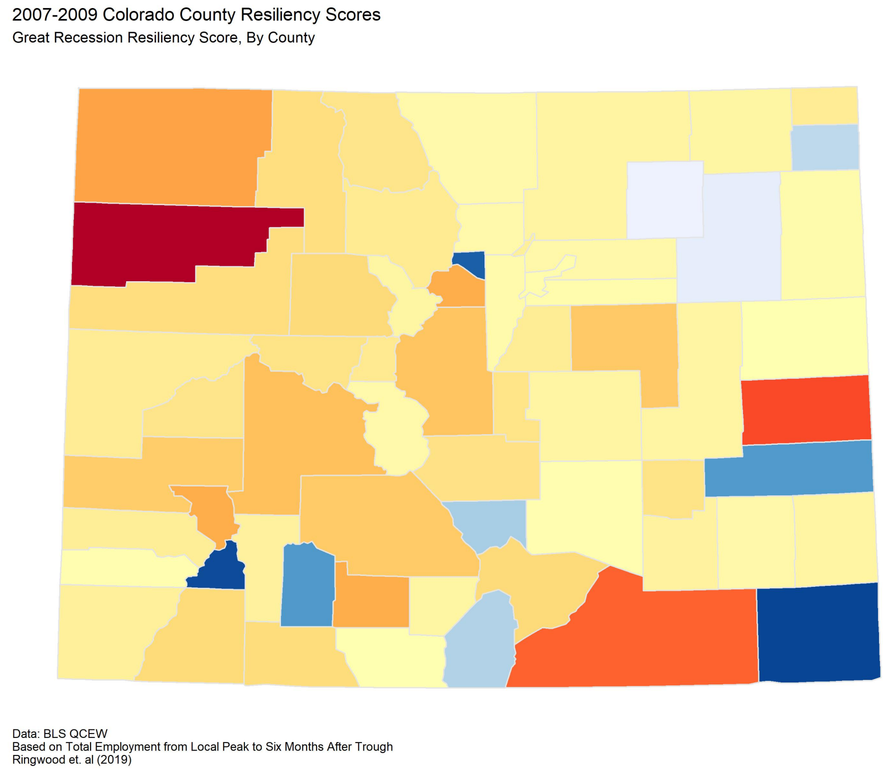
The area of expected variation across the length of the local recession is estimated using equation (3.3). It is estimated using the same process for A_i, or the area where actual employment falls below the local pre-recession trend, where the dips are summed from the beginning of the trend data ($t_{TrendStart}$) through the employment peak month (t_{LR_P}). For the Great Recession $t_{TrendStart}$ is equal to January 2002 and January 2016 for the COVID-19 Recession. This is then divided by the total number of months from $t_{TrendStart}$ to t_{LR_P} to get a per-month average area below the trendline up to the month of peak employment. This value is then multiplied by the number of months a county is in a recession plus six months, or, the difference between t_{LR_P} and $t_{LR_{T+6M}}$.

$$A_{EV} = \left(\sum_{t_{TrendStart}}^{t_{LR_P}} A_i \middle/ (t_{LR_P} - t_{TrendStart}) \right) \times (t_{LR_P} - t_{LR_{T+6M}}) \tag{3.3}$$

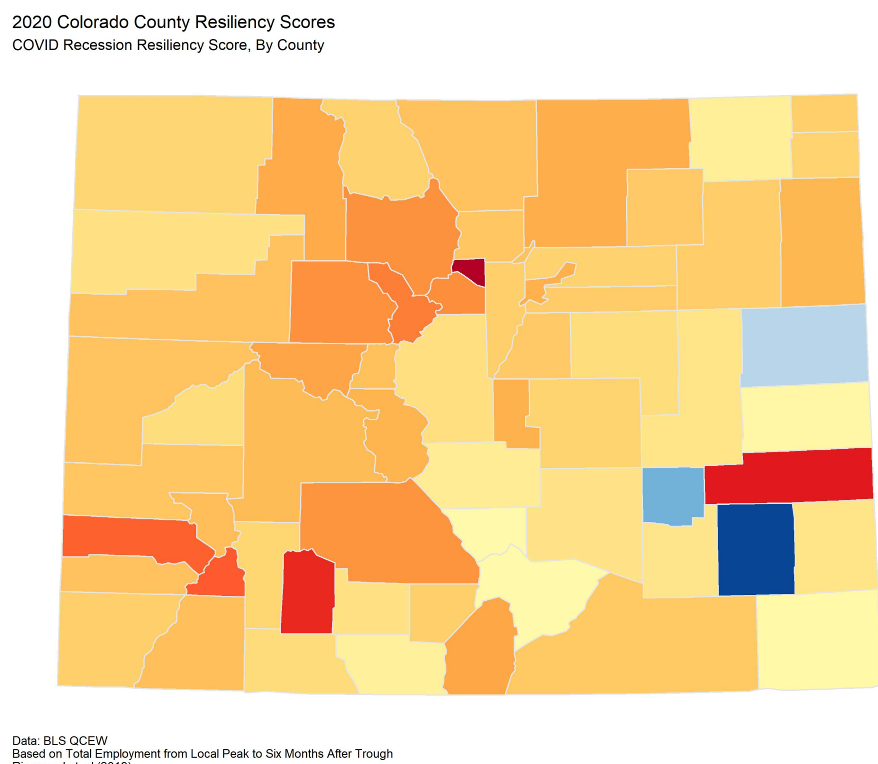
$$\textit{where } A_i \begin{cases} \int_{t_{i-1}}^{i} E_{actual} - \int_{t_{i-1}}^{i} E_{trend} & A_i < 0 \\ 0, & A_i \geq 0 \end{cases}$$

Altogether this creates the resulting value, R_{LR+6M}, which creates our resiliency metric which quantifies regional resilience through a two-dimensional measure that captures the depth and duration of a region's response to a shock by looking at changes in employment while accounting for underlying volatility to separate the response to the shock from random variation (Ringwood et al., 2019). In this paper the methodology for our resiliency metric, R_{LR+6M}, from Ringwood et al. (2019) has was followed as closely as possible for the Great Recession to ensure that similar results are yielded as previously publish in other studies (Watson & Deller, 2022). For the COVID-19 Recession, the author utilized the toolkit defined through previous studies to fine-tune the measure to the more time-specific shock. In Ringwood et al. (2019) and Watson & Deller (2022), a county with a resiliency score equal to or greater than zero was resilient to the shock, while counties with a resiliency score less than zero were not resilient to the shock. When comparing resiliency scores for a given shock period, the greater absolute resiliency scores are more/less resilient.

The maps in Figure 3.4 provide a visualization of the county's response to shocks across the two shock periods. The first map, Figure 3.4a, shows responses to the 2007-2009 Great Recession, the second map, Figure 3.4b, shows responses to the 2020 COVID-19 Recession. Within the maps (Figure 3.4a and 3.4b), it is easier to identify whether a county had a positive or negative resiliency score by noting that those with a negative resiliency score are on a yellow to dark red color scale while counties with a positive resiliency score are on a light blue to dark blue color scale. Therefore, darker reds indicate areas that were less resilient to the economic shock, while darker blues indicate areas that were more resilient to economic shocks. The maps help to visualize the heterogeneity of economic shocks and provide context for how subsequent analysis will evaluate determinants of behind these differences.



(a) Great Recession Employment Resiliency Scores



(b) COVID Employment Resiliency Scores

Figure 3.4: Employment Resiliency Score Maps: (a) Great Recession (b) COVID Recession

3.5.2 Location Quotients

Following the methodology outlined in (Watson & Deller, 2022), the main regressors are county-level locations quotients (LQ) for industry concentrations of NAICS 71 (Arts, Entertainment, and Recreation) and NAICS 72 (Accommodation and Food Services). The location quotients for this analysis are estimated from the annual or average annual estimates for total wages, total employment, and total establishments from the restricted QCEW for 2007 and 2019. The restricted QCEW is utilized because the Bureau of Labor Statistics does not publicly disclose county-level location quotient estimates for roughly one-third of Colorado counties in the public dataset. We calculate these location quotients using the methodology outlined by the BLS for the QCEW[6].

In summary:

> *LQs are calculated by first, dividing local industry employment by the all-industry, all-ownerships total of local employment. Second, national industry employment is divided by the "all industry, all ownerships" total for the nation. Finally, the local ratio is divided by the national ratio.*

For example:

- Local Concentration = (Accommodation and Food Services, Private, Denver County) / (All-Industry Total, All-Ownerships, Denver County)
- National Concentration = (Accommodation and Food Services, Private, U.S.) / (All-Industry Total, All-Ownerships, U.S.)
- Location Quotient (LQ) = Local Concentration / National Concentration

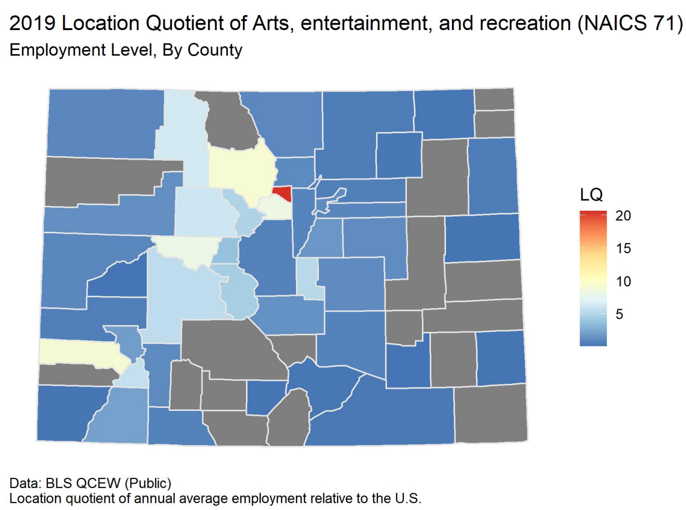


Figure 3.5: Example of Public QCEW LQ for NAICS 71

[6]https://www.bls.gov/cew/about-data/location-quotients-explained.htm

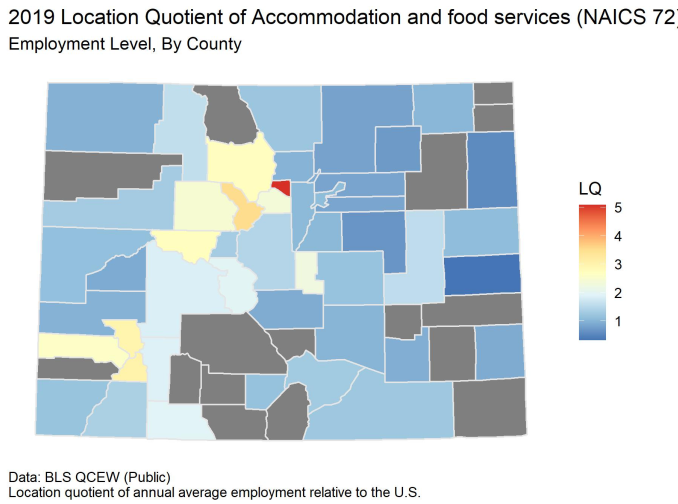


Figure 3.6: Example of Public QCEW LQ for NAICS 72

Figures 3.5 and 3.6 display the publicly disclosed location quotients for average annual employment from the public QCEW at the county level for NAICS industries 71 and 72. The color schemes do vary for these figures from those presented above. Specifically, areas in grey are not disclosed. Counties with darker blue fill mean that the county has a concentration equal to or less than the national concentration for Accommodation and Food Services employment. Counties with light blue, yellow, or red fill mean that the county has a higher concentration of Accommodation and Food Services employment compared to the national county average concentration.

3.6 Empirical Model

The empirical model, based on the one detailed in Watson and Deller (2022), is detailed below:

$$R_c = \beta_0 + \beta_1 LQ_{Arts.,c} + \beta_2 LQ_{Accom,c} + X_c + \epsilon_c$$

where:

- R_c is the Resiliency Score in county c for the given recessionary period
- $LQ_{Arts.,c}$ is the location quotient for Arts, Entertainment, and Recreation (NAICS 71) in county c for the given recessionary period
- $LQ_{Accom.,c}$ is the location quotient for Accommodation and Food Services (NAICS 72) in county c for the given recessionary period

using control variables (X_C):

1. Percent of the Population, Age 5 and up that speaks english "less than well"
2. Pop. Density
3. Pop. to Emp. Ratio
4. Herfindahl Index of Employment
5. Poverty Rate
6. Percent of Housing, Mobile Homes
7. Percent Housing Built in Last 5 Years
8. Nonprofit Orgs per 10k
9. Religious Orgs per 10k

In the analysis we construct three different types of location quotient regressors for industry concentrations within NAICS 71 & NAICS 72 from the restricted QCEW, provided by Colorado Department of Labor and Employment (CLDE) and Bureau of Labor Statistics (BLS), which include:

- Total Annual Wages
- Total Annual Employment
- Total Number of Establishments

We calculate these location quotients using the methodology outlined by Section 3.5.2.

3.7 Resiliency Analysis

3.7.1 Model Estimates

Based on our model in Section 3.6, we estimate the coefficient estimates presented in Table 3.1. Table 3.1 shares estimates for each of the three locations quotient groups of wages, employment and establishments, across the two recessionary shocks of the Great Recession and the COVID Recession.

Table 3.1: OLS Resiliency Model Estimates

	Dependent variable:					
	Resiliency Score, Great Recession			Resiliency Score, COVID		
	(1)	(2)	(3)	(4)	(5)	(6)
LQ, Total Wages$_{Arts,Entertainment,\&Recreation}$	0.320***			−0.024**		
LQ, Total Wages$_{\text{Accommodation and Food Services}}$	1.347***			−0.052		
LQ, Total Employment$_{Arts,Entertainment,\&Recreation}$		0.618***			−0.042***	
LQ, Total Employment$_{\text{Accommodation and Food Services}}$		2.095*			−0.042	
LQ, Total Establishments$_{Arts,Entertainment,\&Recreation}$			1.732**			−0.054
LQ, Total Establishments$_{\text{Accommodation and Food Services}}$			1.666			0.157
Percent Pop. Age 5 & Up that Speaks Eng. Less Than Very Well	26.627	29.437	29.013	−1.580	−1.689	−0.879
Population Density	−0.0001	0.00003	−0.0002	−0.00004	−0.0001	−0.00005
Population to Employment Ratio	0.876**	0.883**	0.777*	0.044	0.046	0.075**
Herfindahl Index of Employment	−76.346***	−68.514***	−44.463**	−1.315	−2.076	−4.510***
Poverty Rate	46.364***	46.594**	29.915*	0.810	1.250	1.909
Percent Mobile Homes	−22.172	−21.989	−35.324**	0.370	0.227	0.491
Percent Housing Built Last 5 Years	68.667	67.510	49.926	−0.351	0.367	2.524
Nonprofit Orgs Per 10k	0.015	0.019	−0.0003	0.0004	0.00003	−0.002
Religious Orgs Per 10k				−0.003	−0.003	−0.001
Constant	−9.101**	−11.843***	−9.138**	−0.425	−0.374	−0.613**
Observations	64	64	64	64	64	64
R^2	0.375	0.346	0.250	0.630	0.636	0.594
Adjusted R^2	0.257	0.222	0.108	0.552	0.558	0.508
Residual Std. Error	5.594 (df = 53)	5.724 (df = 53)	6.130 (df = 53)	0.336 (df = 52)	0.334 (df = 52)	0.352 (df = 52)
F Statistic	3.183*** (df = 10; 53)	2.800*** (df = 10; 53)	1.763* (df = 10; 53)	8.056*** (df = 11; 52)	8.243*** (df = 11; 52)	6.907*** (df = 11; 52)

Note: *p<0.1; **p<0.05; ***p<0.01

Based on the regression estimates in Table 3.1, having increased concentrations of Arts, Entertainment, & Recreation employment, wages, and establishments and increased concentrations of Accommodation & Food Services wages and employment had a positive effect on employment resiliency in Colorado in the Great Recession. However, during the COVID recession increased concentrations of these two tourism industries had no statistically significant, or in cases, mixed effects on employment resiliency outcomes. It is interesting to note that the LQ of establishments for Arts, Entertainment, and Recreation did not have a statistically significant impact on employment resiliency.

Compared to the results from Watson and Deller (2022), in the Great Recession resiliency model[7] the coefficient estimates for location quotients have flipped in sign where their estimates were negative and this estimate is positive. This is likely for two reasons:

1. The analysis in this paper utilized employment data from the QCEW (public for resiliency scores and restricted for location quotients), whereas Watson and Deller (2022) utilized data pulled from a private source, Woods & Poole.

2. Colorado is a fundamentally different economy than the nation, and tourism and hospitality may represent a strength to Colorado rather than a drag on employment during economic shocks such as the Great Recession.

A potential rationale behind the negative statistically significant coefficient estimates of location quotients of Arts, Entertainment, and Recreation wages and employment stems from the heterogeneity of impacts from a recession such as COVID-19. The methodology of the employment resiliency score is very sensitive to changes early in the Pandemic. In the early onset of the pandemic, the most impacted businesses that had to close, stop operation, or significantly cut staff were more likely aligned with non-essential service industries such as Arts, Entertainment, and Recreation. Accommodation and Food Services may have taken less of a hit from the pandemic

[7]Models (1), (2), and (3) in Table 3.1

because many of these businesses were deemed essential and could remain open with delivery are to-go food options.

3.7.2 Comparative Analysis

Now with the estimates from our model, we can use outcomes estimated here to look at counties and state parks that are similar to Fishers Peak and Las Animas County to understand how concentrations of tourism industries affected their resiliency through the Great Recession and the COVID-19 Recession. We will utilize a qualitative approach to compare what has happened in other areas in the past to what we might expect of Las Animas County in the future.

There is challenge in trying to create a comparative analysis related to the resiliency of counties with state parks similar to what Fishers Peak State Park. There haven't been any parks that reside within a comparable county that have been opened within our period of analysis from 2002-2022. This means we can't observe a natural experiment where a park was opened in between the Great Recession and the COVID Recession, which would provide some observable heterogeneity.

Table 3.2: State Parks & Counties Comparable to Fishers Peak & Las Animas County

State Park	Counties
Cheyenne Mountain	El Paso
Golden Gate Canyon	Jefferson, Gilpin
John Martin Reservoir	Bent
Lake Pueblo	Pueblo
Lathrop	Huerfano
Mueller	Teller
Trinidad Lake	Las Animas

However, something we can look at are the relationships between resiliency and the location quotients and other control variables in these areas during both recessions. In short we can analyze the movement and sign of the variables and compared that to the relative outcome of employment resiliency. This can provide useful insights because it can be assumed that the introduction of a State Park, such as Fishers Peak, would increase the concentration of tourism sectors. As has been explored before in Section 3.2, the Great Recession was a wide-spread economic downturn that negatively impacted all sectors while the COVID Recession was a wide-spread social disruption with heterogeneous economic effects. Based on the regression estimates in Table 3.1, having increased concentrations of Arts, Entertainment, & Recreation employment, wages, and establishments and increased concentrations of Accommodation & Food Services wages and employment had a positive effect on employment resiliency in Colorado in the Great Recession. However, during the COVID recession increased concentrations of these two tourism industries had no statistically significant, or in cases, mixed effects on employment resiliency outcomes.

During the Great Recession, concentrations of tourism-related industries in regions that featured outdoor recreation options may have been more of an anchor as many other industries affected by public health guidance were impacted through closures, and thus, were struggling. This may be why we see a positive coefficient on those estimates. However, during COVID, despite increased tourism demand and visitation in Colorado the tourism industry didn't anchor total employment resiliency in the same way as it did during the Great Recession. From the perspective of COVID as both an economic and social disruption, this makes sense as it is unlikely a specific sector could fully hedge an area from experiencing employment loss during the onset of the pandemic caused by such an exogenous shock. The Great Recession can be seen as a shock endogenous to the economy itself. The expected intra-economic system linkages of these two types of "events" are explored in Figure 3.7 and Figure 3.8.

Now that we have a better understanding of these differences, we can better interpret findings through qualitative analysis of parks and areas similar to Fishers Peak and Las Animas County in Table 3.7.2. One of the closest State Parks to Fishers Peak in terms of visitation, features, and surrounding community is John Martin Reservoir and Bent County. Unlike Fishers Peak, John Martin is primarily used for boating and features nearly 12,000 acres of water area. However, they are similar in that they are both some of the largest state parks, have many park activities, and reside in a rural county in Southeast Colorado with a population >15k. Additionally, John Martin Reservoir welcomed 242,374 visitors in 2022 which is very similar to our forecast amount for Fishers Peak of 281,732. Bent County was one of three counties in Colorado that had positive resiliency scores

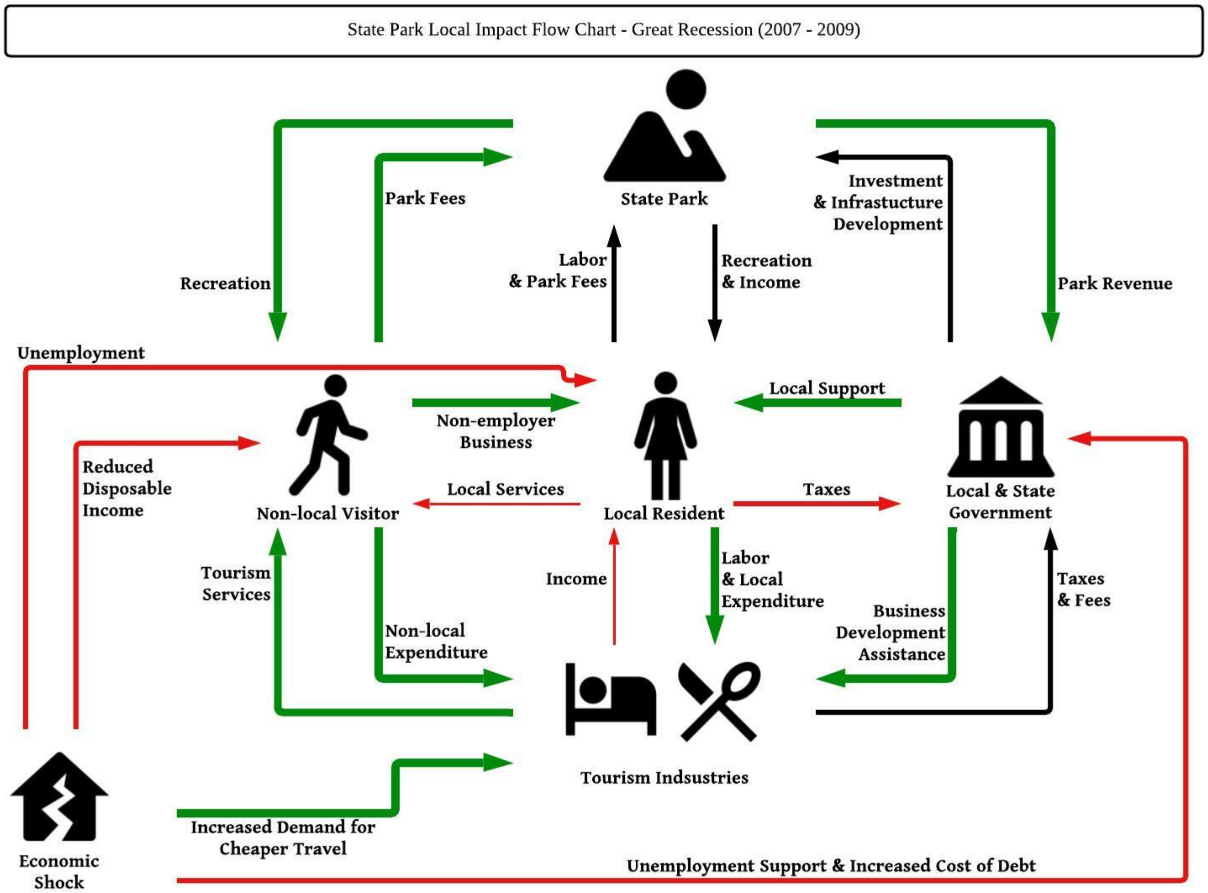


Figure 3.7: Local Economic Linkages of the Great Recession

in the COVID Recession. However, during the Great Recession they had a resiliency score just below zero, meaning they were not resilient. From 2013-2022, John Martin Reservoir had increasing visitation over time. Bent County increased its concentration of arts, entertainment and recreation and its concentration of accommodations and food services decreased. Lathrop State Park and Huerfano County, also near to Fishers Peak, are an area and a smaller park than Fishers Peak with fewer features. Huerfano County had negative resilience scores for both the Great and COVID recessions. However, their resiliency score was much closer to zero during the COVID recession than during the Great Recession. From the Great Recession to the COVID recession, Huerfano had its relative concentration of Arts, Entertainment, and Recreation wages and employment fall, while all other location quotients stayed almost the same.

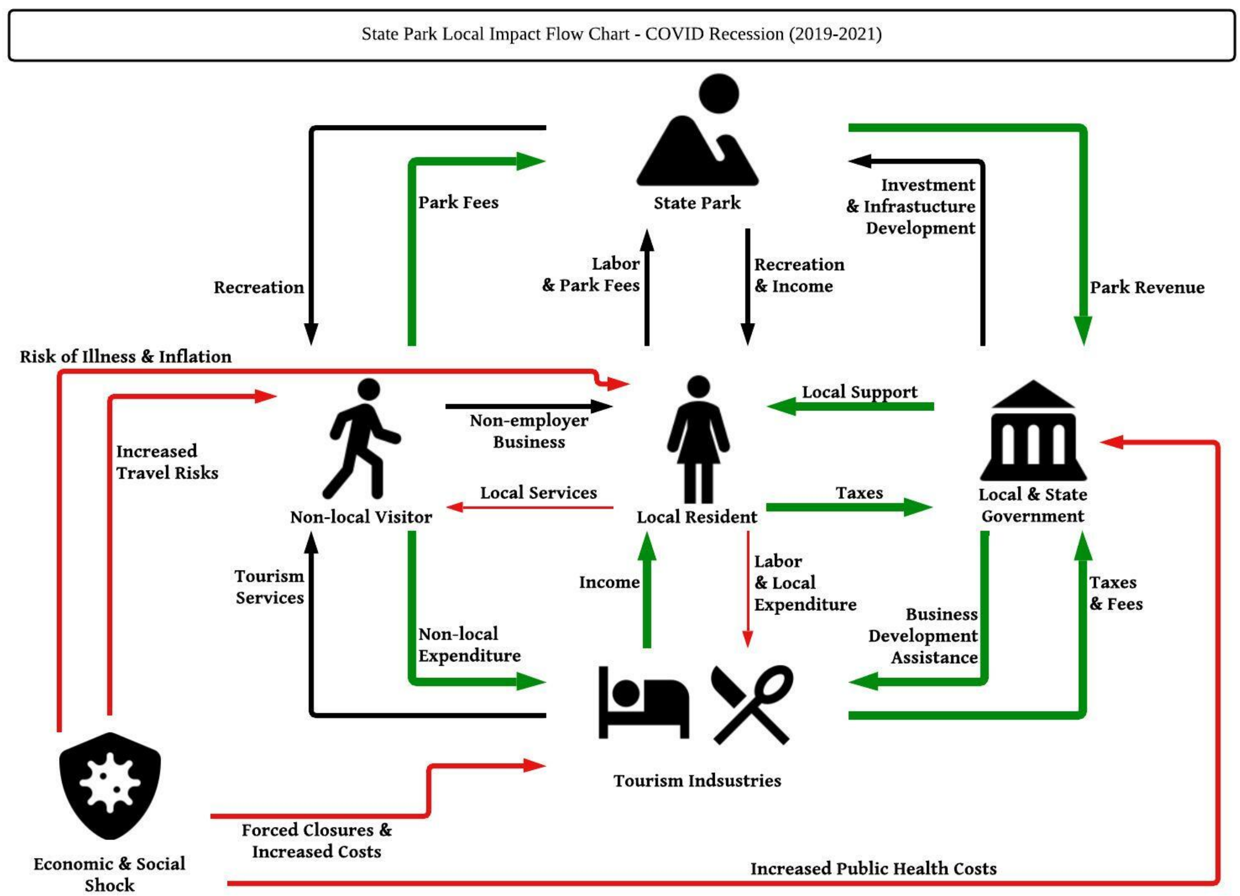


Figure 3.8: Local Economic Linkages of the COVID Recession

Looking to comparable parks to Fishers Peak and analyzing the coefficient estimates in Table 3.1, one could infer that increasing the relative concentrations of tourism industries may improve resiliency outcomes in employment during economic shocks similar to what occurred during the Great Recession.

3.8 Discussion, Conclusion, & Future Analysis

Resiliency metrics can have different outcomes and tell different stories depending on how they are framed and what data is measured. When looking at employment resiliency and its relationship to tourism industries in Colorado, there are a number of key takeaways.

1. While the results for regression coefficients for Great Recession models differ from the results found in Watson and Deller (2022), the methodology yields strong results that tell a consistent story.

2. During the Great Recession in Colorado, concentrations of tourism industries improved county-level employment resiliency. As explored in Section 3.7.2, tourism industries weren't as entangled in the complex financial crisis that spurred the Great Recession. However, for the COVID Recession, the employment resiliency metric yields more questionable results that may be linked to its design and methodology.

The resiliency metric could greatly benefit from continued refinement of a version that leverages a non-linear employment trend. Utilizing a linear trend for a prolonged recession such as the Great Recession makes sense as there are enough observations for the metric to properly capture the effect of the economic down-turn. However, with a more rapid and acute shock, such as COVID-19 and its public health concerns that redefined local economies overnight, it feels as though the metric fails to properly catch the full economic effect of the recession and instead captures lots of noise from social effects caused by lockdowns and other measures used to stop the spread of COVID.

As this research relates to rural Colorado, Las Animas County, and Fishers Peak State Park, research findings provide promising evidence that the inclusion of a new tourism asset that will increase the concentration of accommodations, food services, Arts, Entertainment, and Recreation business and employment will provide an important backstop for employment in the face of more traditional recession such as the one seen from 2007-2009. Fishers Peak State Park has the potential to become an important, multi-faceted natural resource and economic asset within the community of Las Animas County.

Chapter 4

Conclusions on the Distributional and Resiliency Impacts of Investments in Rural Outdoor Tourism

Rural outdoor tourism assets such as state parks tend to draw tourism dollars as well as serving as a catalyst to improve the subjective quality of life for the citizens and regional workforce in adjacent areas. Fishers Peak State Park can be an important agent of change within the community of Las Animas County and Trinidad, CO. From the analysis drawn from Chapters 2 we find that Fishers Peak State Park is able to provide employment growth within Las Animas County that increases the distribution of incomes.

Specifically the analysis concludes that additional employment from the addition of Fishers Peak State Park will likely increase the income of the lowest quintile group. It is important that the jobs being added to Las Animas County from additional expenditures caused by non-local visitation from Fishers Peak State increases the earnings of the lowest income quintile because that would suggest that the new tourism asset is improving outcomes for local residents seeking economic mobility. Appendix A details the occupational employment table from IMPLAN and shows the amount of employment and average wage of the occupation from jobs added by Fishers Peak State Park.

From the addition of this tourism asset and additional employment in tourism-related industries, and based on the analysis in Chapter 3, we draw a few conclusions about the impacts of increased concentrations of tourism industries on employment resiliency.

1. Increased concentrations of tourism-related industries have mixed effects on improving employment resiliency in Colorado depending on the economic shock. For the Great Recession the results suggest that counties in Colorado with higher concentrations of tourism-related industries were more resilient to the Great Recession, but less resilient to the COVID Recession.

2. Based on the findings of both additional employment from a tourism asset such as Fishers Peak and that increased tourism-related industries has a mixed effect on employment resiliency, there can be a casual observation that with Fisher Peak Las Animas County may be:

   (a) More resilient to the shock if there is an economic shock similar to the Great Recession.

   (b) Marginally less resilient to the shock if there is an economic shock similar to the COVID Recession.

These are positive signs for the long-term level and distribution of employment within Las Animas County. However, further analysis would be required to estimate the effect that additional tourism-related employment from Fishers Peak State Park would have on employment resiliency within the county of Las Animas.

Bibliography

Brochure. (2022). *Colorado state recreation lands brochure.* Retrieved from https://cpw.state.co.us/Documents/RulesRegs/Brochure/lands.pdf

Census, U. (n.d.-a). *American community survey, subject table: S0701.* U.S. Census Bureau. Retrieved from https://data.census.gov/cedsci/table?q=migration&tid=ACSST1Y2019.S0701&moe=false&hidePreview=true

Census, U. (n.d.-b). *American community survey, subject table: S1903.* U.S. Census Bureau. Retrieved from https://data.census.gov/cedsci/table?q=migration&tid=ACSST1Y2019.S1903&moe=false&hidePreview=true

Cline, S., & Seidl, A. (2010). Combining non-market valuation and input–output analysis for community tourism planning: Open space and water quality values in colorado, usa. *Economic Systems Research*, *22*(4), 385–405. doi: 10.1080/09535314.2010.525740

Colorado state parks: Fishers peak. (2022). Retrieved from https://cpw.state.co.us/placestogo/parks/FishersPeak

Davidova, S. M., Thomson, K. J., & Mishra, A. K. (2019). *Rural policies and employment: Transatlantic experiences*. World Scientific.

Gascoigne, W., Sullins, M., & Thilmany, D. D. (2008). Agritourism in the west: Exploring the behavior of colorado farm and ranch visitors. *Western Economics Forum*, *7*(1837-2016-151775), 12–24.

Han, Y., & Goetz, S. J. (2015). The economic resilience of us counties during the great recession. *Review of Regional Studies*, *45*(2), 131–149.

Incera, A. C., & Fernández, M. F. (2015). Tourism and income distribution: Evidence from a developed regional economy. *Tourism Management*, *48*, 11–20.

Kitsos, A., & Bishop, P. (2018). Economic resilience in great britain: the crisis impact and its determining factors for local authority districts. *The Annals of Regional Science*, *60*(2), 329–347.

Marcouiller, D. W. (2007). "boosting" tourism as rural public policy: Panacea or pandora's box? *Journal of Regional Analysis and Policy*, *37*(1100-2016-89815), 28–31.

Master Plan, F. P. S. P. (2022). *Fishers peak state park master plan public survey report and analysis.* Retrieved from `https://static1.squarespace.com/static/5e78ecb72545274dff397f14/t/615486dc4abe0574ca529ea4/1632929502693/FP+Survey+Report+Draft.pdf`

McGehee, N. G., & Kim, K. (2004). Motivation for agri-tourism entrepreneurship. *Journal of travel research*, *43*(2), 161–170.

Oh, J. Y., & Schuett, M. A. (2010). Exploring expenditure-based segmentation for rural tourism: Overnight stay visitors versus excursionists to fee-fishing sites. *Journal of travel & tourism marketing*, *27*(1), 31–50.

Orens, A., & Seidl, A. (2009). Working lands and winter tourists in the rocky mountain west: a travel cost, contingent behaviour and input–output analysis. *Tourism Economics*, *15*(1), 215–242.

Palacios, C., & Caneday, L. (2014). An investigation on visitors' expenditure pattern at oklahoma state parks. *Illuminare*, *12*.

Pender, J., Marré, A., & Reeder, R. (2012). Rural wealth creation concepts, strategies, and measures. *USDA-ERS Economic Research Report*(131).

Quickfacts, C. (2020). *U.s. census bureau quickfacts: Las animas county, colorado.* Retrieved from `https://www.census.gov/quickfacts/lasanimascountycolorado`

Reeder, R. J., & Brown, D. M. (2005). *Rural areas benefit from recreation and tourism development* (Tech. Rep.).

Ringwood, L., Watson, P., & Lewin, P. (2019). A quantitative method for measuring regional economic resilience to the great recession. *Growth and change*, *50*(1), 381–402.

Sanchez, H. (2018, Jul). *Map: Income inequality in colorado is most extreme near ski towns.* Colorado Public Radio. Retrieved from `https://www.cpr.org/2018/07/26/map-income-inequality-in-colorado-is-most-extreme-near-ski-towns/`

Schuck, S., & Rudd, J. (2022). *Fishers peak state park: evaluating a new natural amenity in southern colorado* (Tech. Rep.).

Scruggs, L. (2014). *Florida state parks economic impact assessment.* Retrieved from `http://apalachee.floridatrail.org/wp-content/uploads/2013/04/Florida-State-Parks-Economic-Impact-Assessment-FY-2013-2014-10-23-14.pdf`

Svaldi, A. (2021, Aug). *Colorado's richer enclaves make it a leader in wealth disparity.* The Denver Post. Retrieved from `https://www.denverpost.com/2021/08/27/colorado-wealth-gap-asset-income-disparity/`

Thilmany, D., Sullins, M., & Ansteth, A. (2007). *2006 economic contribution of agritourism to colorado: estimates from a survey of colorado tourists, the.*

TPL, T. (2020). *Economic analysis of fishers peak state park.*

UCDANR. (2017). *"agritourism." what is sustainable agriculture?* UC Division of Agriculture and Natural Resources. Retrieved from `https://sarep.ucdavis.edu/sustainable-ag/agritourism`

Van Sandt, A., Low, S. A., & Thilmany, D. (2018). Exploring regional patterns of agritourism in the us: What's driving clusters of enterprises? *Agricultural and Resource Economics Review*, *47*(3), 592–609.

Watson, P., & Deller, S. (2022). Tourism and economic resilience. *Tourism Economics*, *28*(5), 1193–1215.

Weiler, S. (2006). A park by any other name: National park designation as a natural experiment in signaling. *Journal of Urban Economics*, *60*(1), 96–106.

Weiler, S., & Seidl, A. (2004). What's in a name? extracting econometric drivers to assess the impact of national park designation. *Journal of Regional Science*, *44*(2), 245–262.

Appendix A

Table A.1: IMPLAN Input-Output Model Occupation Table

Occupation	Income Level	Income Rank	Wage and Salary Emp.	Avg Wage and Salary
Food and Beverage Serving	$15,000 to $24,999	3	93	$17,650
Cooks and Food Preparation	$15,000 to $24,999	3	52	$22,818
Building Cleaning and Pest Control	$25,000 to $34,999	4	41	$25,456
Retail Sales	$15,000 to $24,999	3	37	$21,890
Other Installation, Maintenance, and Repair Occupations	$35,000 to $49,999	5	33	$35,654
Information and Record Clerks	$25,000 to $34,999	4	30	$27,506
Grounds Maintenance	$25,000 to $34,999	4	26	$25,033
Other Food Preparation and Serving Related	$15,000 to $24,999	3	24	$15,531
Entertainment Attendants and Related	$10,000 to $14,999	2	23	$13,798
Supervisors of Food Preparation and Serving	$35,000 to $49,999	5	20	$40,491
Top Executives	$65,000 to $74,999	7	18	$74,722
Other Personal Care and Service	$25,000 to $34,999	4	15	$26,047
Other Management Occupations	$50,000 to $64,999	6	14	$63,221
Other Office and Administrative Support	$25,000 to $34,999	4	12	$31,310
Material Moving	$25,000 to $34,999	4	9	$27,749
Business Operations Specialists	$50,000 to $64,999	6	8	$52,714
Other Protective Service	$25,000 to $34,999	4	8	$28,157
Financial Clerks	$35,000 to $49,999	5	8	$37,431
Secretaries and Administrative Assistants	$35,000 to $49,999	5	6	$37,582
Supervisors of Office and Administrative Support	$35,000 to $49,999	5	5	$45,675
Supervisors of Building and Grounds Cleaning and Maintenance	$35,000 to $49,999	5	5	$37,194
Supervisors of Personal Care and Service	$35,000 to $49,999	5	5	$44,298
Motor Vehicle Operators	$25,000 to $34,999	4	5	$32,677
Supervisors of Sales	$35,000 to $49,999	5	5	$44,372
Financial Specialists	$50,000 to $64,999	6	4	$60,272
Entertainers and Performers, Sports and Related	$35,000 to $49,999	5	4	$37,651
Healthcare Diagnosing or Treating Practitioners	$75,000 or more	8	4	$95,039
Home Health and Personal Care Aides; and Nursing Assistants, Orderlies, and Psychiatric Aides	$15,000 to $24,999	3	4	$21,210
Vehicle and Mobile Equipment Mechanics, Installers, and Repairers	$35,000 to $49,999	5	3	$38,713
Supervisors of Installation, Maintenance, and Repair	$50,000 to $64,999	6	3	$53,811
Sales Representatives, Services	$50,000 to $64,999	6	3	$50,604
Operations Specialties Managers	$75,000 or more	8	3	$84,697
Material Recording, Scheduling, Dispatching, and Distributing	$35,000 to $49,999	5	3	$44,422
Textile, Apparel, and Furnishings	$15,000 to $24,999	3	2	$21,361
Tour and Travel Guides	$15,000 to $24,999	3	2	$20,892
Food Processing	$25,000 to $34,999	4	2	$32,158
Other Teachers and Instructors	$25,000 to $34,999	4	2	$31,737
Other Transportation	$25,000 to $34,999	4	2	$25,362
Health Technologists and Technicians	$35,000 to $49,999	5	2	$47,056
Agricultural	$25,000 to $34,999	4	1	$34,616
Computer Occupations	$65,000 to $74,999	7	1	$65,866
Animal Care and Service	$15,000 to $24,999	3	1	$24,103
Baggage Porters, Bellhops, and Concierges	$15,000 to $24,999	3	1	$24,508
Counselors, Social Workers, and Other Community and Social Service Specialists	$35,000 to $49,999	5	1	$39,717
Other Healthcare Support Occupations	$25,000 to $34,999	4	1	$31,496

Appendix B

Table B.1: State Park's Counties

State Park	Counties
Barr Lake	Adams
Boyd Lake	Larimer
Castlewood Canyon	Douglas
Chatfield	Douglas, Jefferson
Cherry Creek	Arapahoe
Cheyenne Mountain	El Paso
Corn Lake Section	Mesa
Crawford	Delta, Montrose
Eldorado Canyon	Boulder
Eleven Mile	Park
Elkhead Reservoir	Moffat, Routt
Corn Lake Section	Mesa
Golden Gate Canyon	Jefferson, Gilpin
Harvey Gap	Garfield
Highline Lake	Mesa
Island Acres Section	Mesa
Jackson Lake	Morgan
John Martin Reservoir	Bent
Lake Pueblo	Pueblo
Lathrop	Huerfano
Lory	Larimer
Mancos	Montezuma
Mueller	Teller
Navajo	Archuleta, La Plata
North Sterling	Logan
Paonia	Gunnison
Pearl Lake	Routt
Ridgway	Ouray
Rifle Falls	Garfield
Rifle Gap	Garfield
Roxborough	Douglas
Spinney Mountain	Park
St. Vrain	Weld
Stagecoach	Routt
State Forest	Jackson, Larimer
Staunton	Park, Jefferson
Steamboat Lake	Routt
Sweitzer Lake	Delta
Sylvan Lake	Eagle
Trinidad Lake	Las Animas
Vega	Mesa
Yampa River	Routt, Moffat

Appendix C

Table C.1: Descriptive Statistics: 2013 and 2018 Sample

Statistic	N	Mean	St. Dev.	Min	Max
Visitation	84	299,209	461,409	20,088	2,322,293
Park Acres	84	4,867	11,038	35	71,194
Park Acres, Land	84	3,799	10,894	20	71,024
Park Acres, Water	84	1,068	2,005	0	11,749
Agg. Weighted Income	84	61,392	16,143	33,298	115,314
Agg. County Households	84	68,936	82,469	1,744	347,579

Table C.2: Descriptive Statistics: 2014 and 2019 Sample

Statistic	N	Mean	St. Dev.	Min	Max
Visitation	84	305,275	457,368	20,369	2,467,245
Park Acres	84	4,867	11,038	35	71,194
Park Acres, Land	84	3,799	10,894	20	71,024
Park Acres, Water	84	1,068	2,005	0	11,749
Agg. Weighted Income	84	62,916	17,093	30,900	119,730
Agg. County Households	84	69,800	83,540	1,767	352,993

Table C.3: Descriptive Statistics: 2015 and 2020 Sample

Statistic	N	Mean	St. Dev.	Min	Max
Visitation	84	366,031	549,610	26,272	3,066,667
Park Acres	84	4,867	11,038	35	71,194
Park Acres, Land	84	3,799	10,894	20	71,024
Park Acres, Water	84	1,068	2,005	0	11,749
Agg. Weighted Income	84	64,053	17,388	31,715	121,393
Agg. County Households	84	70,117	84,082	1,635	350,499

Appendix D

Please see next page for Fixed Effects Models.

Table D.1: State Park Visitation Regression Results, Year Fixed Effects

	Dependent variable: ln (Annual Visitation)											
Start, Sample Year	(2013)	(2014)	(2015)	(2016)	(2013)	(2014)	(2015)	(2016)	(2013)	(2014)	(2015)	(2016)
End, Sample Year	(2018)	(2019)	(2020)	(2021)	(2018)	(2019)	(2020)	(2021)	(2018)	(2019)	(2020)	(2021)
Model Specification	[A]				[B]				[C]			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln_Park_Acres	0.280^{***}	0.269^{***}	0.289^{***}	0.297^{***}								
ln_Land_Acres					0.194^{***}	0.178^{***}	0.184^{***}	0.184^{***}	0.285^{***}	0.272^{***}	0.291^{***}	0.298^{***}
Water_Acres					0.0002^{***}	0.0002^{***}	0.0002^{***}	0.0002^{***}				
Pct_Water_Acres									0.761^{*}	0.791^{*}	0.946^{**}	0.859^{**}
ln_MedianIncome	−0.230	−0.188	−0.174	−0.334	0.033	0.108	0.156	0.079	−0.150	−0.095	−0.038	−0.226
ln_AggHouseholds	0.340^{***}	0.316^{***}	0.283^{***}	0.284^{***}	0.381^{***}	0.356^{***}	0.329^{***}	0.334^{***}	0.352^{***}	0.330^{***}	0.302^{***}	0.298^{***}
2018 FE	0.190				0.157				0.180			
2019 FE		0.213				0.164				0.197		
2020 FE			0.381^{**}				0.318^{*}				0.355^{*}	
2021 FE				0.303				0.208				0.278
Constant	8.821^{**}	8.754^{**}	8.888^{**}	10.640^{**}	6.091	5.686	5.479	6.310	7.682	7.437^{*}	7.020	9.170^{*}
Observations	84	84	84	84	84	84	84	84	84	84	84	84
R^2	0.386	0.391	0.405	0.381	0.425	0.435	0.457	0.460	0.389	0.395	0.411	0.382
Adjusted R^2	0.355	0.360	0.375	0.350	0.389	0.399	0.422	0.426	0.350	0.356	0.374	0.342
Residual Std. Error	0.842	0.793	0.782	0.802	0.820	0.769	0.751	0.754	0.845	0.796	0.782	0.807
F Statistic	12.398^{***}	12.683^{***}	13.429^{***}	12.161^{***}	11.553^{***}	12.013^{***}	13.142^{***}	13.315^{***}	9.933^{***}	10.171^{***}	10.906^{***}	9.631^{***}

Note: *p<0.1; **p<0.05; ***p<0.01

Appendix E

Table E.1: State Park Visitation Regression Results, State Park Fixed Effects

	Dependent variable:											
	ln_Visitation											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln_Park_Acres	−2.398***	−1.226**	−1.181	−0.049								
ln_Land_Acres					0.026	0.280	0.446	0.565*	10.467***	6.452***	6.941**	2.538
Water_Acres					−0.005***	−0.003***	−0.003**	−0.001				
Pct_Water_Acres									−54.467***	−32.194***	−33.883**	−10.294
ln_MedianIncome	0.339	0.615**	1.507***	1.030***	0.339	0.615**	1.507***	1.030***	0.339	0.615**	1.507***	1.030***
ln_Households	3.378***	1.741**	1.695	0.162	3.378***	1.741**	1.695	0.162	3.378***	1.741**	1.695	0.162
Boyd Lake	1.033***	1.223***	1.184***	1.097***	2.046***	2.152***	2.350***	1.986***	32.674***	20.255***	21.403**	7.775
Castlewood Canyon	1.008	0.381	−0.216	−0.439	−6.682***	−4.399***	−5.380***	−2.387*	−39.817***	−23.984***	−25.992**	−8.649
Chatfield	1.309***	1.746***	1.377***	1.878***	−1.571*	−0.160	−0.744	0.904	−30.750***	−17.407***	−18.896**	−4.611
Cherry Creek	2.429***	2.265***	2.121***	2.355***	−2.506**	−0.866	−1.297	0.969	−32.094***	−18.355***	−19.703**	−4.623
Cheyenne Mountain	−1.481**	−0.628*	−0.709	0.080	−9.238***	−5.449***	−5.918**	−1.884	−42.659***	−25.203***	−26.708**	−8.200
Corn Lake Section	−4.359***	−2.251**	−2.175	−0.166	−4.505**	−2.291**	−2.192	−0.098	6.212***	4.043***	4.474***	1.927
Crawford	2.435***	1.437***	1.513**	0.066	−0.497*	−0.256	−0.245	−0.402*	11.959***	7.107***	7.504**	1.952
Eldorado Canyon	0.152	0.375*	0.173	0.605**	−6.083***	−3.500***	−4.013**	−0.974	−32.943***	−19.376***	−20.723**	−6.050
Eleven Mile	13.700***	7.331***	7.134*	1.161	19.041***	10.334***	10.207*	1.846	−9.994***	−6.828***	−7.855***	−3.642
Elkhead Reservoir	7.219***	3.832**	3.813*	0.387	4.195**	1.975*	1.818	−0.333	−1.688**	−1.502***	−1.841***	−1.445**
Fruita Section	−6.796**	−3.198**	−3.012	0.417	−3.938*	−1.276	−0.857	1.449	37.135***	23.001***	24.694**	9.212
Golden Gate Canyon	4.046***	2.799***	2.665***	1.619**	−7.269***	−4.234***	−4.934**	−1.249	−56.168***	−33.137***	−35.353**	−10.491
Harvey Gap	0.307	−0.370	−0.311	−1.000**	−1.223***	−1.071***	−0.932***	−0.857***	33.732***	19.591***	20.814**	5.749
Highline Lake	−0.298	0.013	0.187	0.345	−3.450***	−1.872***	−1.811*	−0.299	−0.663	−0.225	−0.077	0.228
Island Acres	0.168	0.049	0.054	−0.191	−3.708***	−2.307***	−2.462***	−1.059	−7.458***	−4.523***	−4.794**	−1.768
Jackson Lake	9.517***	5.134***	5.226*	0.846	12.966***	7.370***	7.691**	1.915	28.364***	16.472***	17.270**	4.825
John Martin	18.999***	10.125***	10.517*	1.990	61.176***	35.257***	37.082**	10.388	26.980***	15.044***	15.810**	3.925
Lake Pueblo	10.267***	6.784***	6.906***	3.456*	19.089***	11.705***	11.919**	4.505	−37.389***	−21.677***	−23.215**	−6.169
Lathrop	12.290***	6.511***	6.962*	0.821	6.930**	3.177*	3.359	−0.541	−13.785***	−9.066***	−9.527***	−4.456
Lory	0.429	0.206	0.175	−0.050	−7.228***	−4.552***	−4.966***	−1.989	−40.214***	−24.050***	−25.486**	−8.223
Mancos	3.725**	1.408	1.709	−0.869	0.739	−0.352	−0.140	−1.422*	8.241***	4.083**	4.528	−0.004
Mueller	11.065***	5.631**	5.444	0.386	1.784	−0.137	−0.788	−1.966	−38.261***	−23.807***	−25.700**	−9.534
Navajo	8.077***	4.519***	4.398*	0.926	12.105***	6.850***	6.822**	1.580	−0.219	−0.435	−0.845	−0.749
North Sterling	11.692***	6.097***	6.662*	0.872	15.383***	8.175***	8.790*	1.349	−4.143***	−3.366***	−3.358***	−2.341**
Paonia	7.652**	3.123*	3.263	−1.006	2.722	0.075	−0.020	−2.220	−12.697***	−9.038***	−9.612***	−5.134**
Pearl Lake	2.768**	0.776	0.648	−1.001	1.117	−0.061	−0.153	−1.018	28.435***	16.086***	16.842**	4.145
Ridgway	15.972***	8.797***	8.462*	1.776	12.851***	6.816**	6.300	0.897	−4.245**	−3.289***	−4.336**	−2.334
Rifle Falls	−3.149***	−1.704**	−1.694	−0.124	−1.140	−0.455	−0.344	0.385	7.519***	4.662***	5.042**	2.021
Rifle Gap	5.682***	3.119***	2.961*	0.682	1.292*	0.423	0.067	−0.360	−8.406***	−5.309***	−5.966**	−2.192
Roxborough	1.351*	0.402	−0.181	−0.627	−6.912***	−4.733***	−5.729***	−2.720*	−42.512***	−25.775***	−27.875**	−9.448
Spinney Mountain	11.119**	5.297**	5.319	−0.317	12.454**	5.912**	5.868	−0.431	−15.533***	−10.630***	−11.543***	−5.721*
St. Vrain	−0.996**	−0.389	−0.329	0.267	−5.228***	−2.987***	−3.118**	−0.736	−15.015***	−8.771***	−9.206**	−2.586
Stagecoach	8.231***	4.256**	4.055	0.384	5.465**	2.608**	2.312	−0.167	8.255***	4.257**	4.048	0.360
State Forest	9.469***	5.166***	4.753*	0.758	−5.439***	−4.123***	−5.294***	−3.067**	−73.643***	−44.436***	−47.723**	−15.957
Staunton State Park	−0.652**	−0.489**	−0.650**	−0.404	−9.235***	−5.824***	−6.414***	−2.578	−46.251***	−27.703***	−29.441**	−9.574
Steamboat Lake	10.270***	5.766***	5.477*	1.315	7.046***	3.739**	3.274	0.449	−7.289***	−4.734***	−5.643***	−2.260
Sweitzer Lake	1.339*	0.487	0.853	−0.570	0.414	0.170	0.650	−0.259	39.291***	23.149***	24.834**	7.088
Sylvan Lake	4.814**	2.521**	2.194	−0.469	−1.442	−1.366**	−2.004***	−2.051***	−27.680***	−16.875***	−18.327***	−7.010
Trinidad Lake	11.454***	6.107***	6.301*	1.157	6.870**	3.220**	3.162	−0.085	−16.297***	−10.473***	−11.250***	−4.463
Vega	2.703***	1.629***	1.731**	0.576								
Yampa River												
Constant	−13.310**	−6.057*	−15.566***	−0.927	−24.702***	−13.137***	−23.215***	−3.813	−73.779***	−42.145***	−53.745**	−13.088
Observations	84	84	84	84	84	84	84	84	84	84	84	84
R^2	0.974	0.989	0.971	0.977	0.974	0.989	0.971	0.977	0.974	0.989	0.971	0.977
Adjusted R^2	0.946	0.976	0.941	0.951	0.946	0.976	0.941	0.951	0.946	0.976	0.941	0.951
Residual Std. Error	0.243	0.153	0.241	0.219	0.243	0.153	0.241	0.219	0.243	0.153	0.241	0.219
F Statistic	34.917***	80.077***	31.535***	38.854***	34.917***	80.077***	31.535***	38.854***	34.917***	80.077***	31.535***	38.854***
Note:												*p<0.1; **p<0.05; ***p<0.01