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Publication Date

2012-04-01

DOI

10.1111/j.1465-7287.2011.00277.x

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Did the Great Recession Reduce Visitor Spending and Willingness to Pay for Nature-Based Recreation? Evidence from 2006 and 2009.

Abstract

Outdoor recreation is a relatively large industry that can diversify public land based economies that have traditionally relied upon resource extraction. But what happens to nature-based recreation visitor spending and benefits during times of national economic recession? To address this question, we replicate a 2006 high mountain recreation study in the same region, three years later during the 2009 recession. Results indicate that nature-based public lands recreation in this area did not experience reductions in most categories of visitor spending or total number of visits during the recession. These results imply that nature-based recreation may represent an economically stable industry in public land mountain economies. Total benefits to the visitors are also quite stable, only dropping from $129 per person per trip in 2006 to $120 in 2009. This 7% drop in WTP is not statistically significant at conventional levels.

(JEL Q26).

Acknowledgements: We would like to thank the Colorado Fourteener Initiative and the Mosquito Range Heritage Initiative for assistance in the data collection. This paper benefitted from suggestions provided by three anonymous referees. Any remaining errors are the responsibility of the authors. This research project was funded by USDA-NRI Grant#2008-02698.

Introduction

The U.S. economy experienced considerable change from 2006 to 2009. During 2006-2007, the unemployment rate was under 5%; however, in fall 2009, the national unemployment rate topped 10% for the first time since 1983 (Bureau of Labor Statistics, 2009). After reaching its peak of 14,164 in October 2007, the Dow Jones Industrial Average tumbled to below 6,600 in March 2009. In addition to declines in consumer confidence, the U.S. GDP declined four consecutive quarters during 2008-2009, marking the longest U.S. recession in 60 years (Bureau of Economic Analysis, 2009). The grey literature dubbed this recession the "Great Recession," attempting to draw parallels with the Great Depression of the 1930's (Isidore, 2009).

Many sectors of the U.S. economy, such as the $300 billion domestic automobile industry (McAlinden, et al.), were hit hard by the recession. However, less was attention given to the active outdoor recreation industry with sales of $290 billion (Outdoor Industry Foundation, 2006), with sales an industry with sales similar to the U.S. domestic automobile manufacturing industry. This is. This industry is an aggregate of outdoor recreation equipment sales and recreation trip expenditures for camping, fishing, hunting, snow sports, hiking, water-based recreation and wildlife viewing. Hiker and backpacker spending is one of the largest categories of the active outdoor recreation industry. Trail-based recreation accounts for $83 billion, or nearly 30% of the industry (Outdoor Industry Foundation, 2006). Trail-based recreation-spending also supports over 700,000 jobs (Outdoor Industry Foundation, 2006), a figure similar to direct employment in automobile manufacturing (McAlinden, et al.) The majority of the recreation spending is trip related spending (e.g., gasoline, hotels, food), rather than purely purchases of durable equipment. High expenditures and consumer surplus have been

documented for nature-based recreation when the economy is at its peak (Outdoor Industry Foundation, 2006; Keske and Loomis, 2007), but did consumer expenditures and willingness to pay for nature-based recreation fall during the Great Recession?

This study focuses on changes in visitation, expenditures and consumer surplus for nature-based, high mountain recreation during times of macroeconomic change. In this paper, we replicate a 2006 survey design and sampling frame to investigate how visitor benefits and visitor trip spending changed between 2006 and 2009 for trail-based recreation in Colorado. Hiking and backpacking are popular activities nationwide, and results from the Colorado study may be transferrable to other regions offering these activities. More than one-third of the U.S. population over the age of 16 participates in hiking or backpacking, representing over 50 million participants (Cordell, et al., 1999). Greater than one billion days are spent hiking or backpacking in the United States (Cordell, et al., 1999). Others project that this is a trend that will continue into the future. For example, Bowker et al. (1999) forecasts that the number of days of hiking is expected to increase by about 5% a decade between the years 2000 and 2050, for a cumulative increase of 25% over this time period.

If recreation expenditures are unchanged across periods of economic prosperity and decline, then recreation has potential to be a stabilizing economic sector in rural economies. Mountain economies, including our study area, frequently experience competing economic development interests from energy and mineral extraction industries (Loomis, 2002), which are known for economic volatility (Davis and Tilton, 2005). Extraction of energy/minerals is a notable driver of the Colorado economy. One report estimates the 2007 economic contribution of the energy

and mineral industry to the Colorado economy to be as high as $11 billion (approximately 5%) of the state's gross state product (Corporation for a Skilled Workforce, 2009). However, like other extraction economies, the western side of Colorado has been quite hard hit by the economic recession, due in part to the drop in energy and mineral exploration in the region that encompasses our study area (Bureau of Land Management, 2007).

The economic boom-bust cycles associated with extraction are driven by fluctuations in prices and spending leakages that result from high rates of commodity exportation. When an economic structure is heavily export-based, other sectors within the economy may be under-developed, creating an over-reliance on one industry. This is commonly known as the "Dutch Disease" (Davis, 1995). The exportation of energy and minerals, combined with the often temporary workforce, frequently does not generate sustainable regional spending multipliers. The combination of commodity price volatility and an undiversified, extraction-based economy can result in a deep economic retraction. Economic diversification is a key component of achieving economic stability in these resource-based economies (Davis, 1995; Davis and Tilton, 2005; Iimi, 2007). One avenue toward diversification in resource based economies is to promote natural resource-based recreational use by outsiders. Of course tourism is also export driven, so one issue of interest in this paper is whether the tourism sector is able to withstand periods of significant recession. If so, then promotion of recreation industry in natural resource based economies may serve to diversify and thus stabilize rural economies that have been traditionally reliant on extraction. In this paper we test whether visitor recreation expenditures withstood the "Great Recession" and thus may be used as a strategy to diversify mountain economies.

However, sales to visitors are only part of the economic picture. The economic efficiency benefits of outdoor recreation include how much more visitors themselves would pay in excess of their travel costs (i.e., their consumer surplus). If visitor income falls during the recession, then it is certainly possible that net willingness to pay (WTP) for recreation opportunities might fall, if the activity is a normal good. Further, net WTP might be influenced by visitors feeling "poorer" due to their wealth losses in the stock and housing markets. To investigate this, we implement a contingent valuation model to test whether willingness to pay changes from 2006 to 2009 in the same Colorado study area. Knowing whether or not benefit estimates are susceptible to macroeconomic fluctuations may be useful for long term federal and state agency public land management planning, including management of recreational areas that have time horizons of 10-15 years. Further, when conducting benefit transfers it is often necessary to combine prior benefit estimates over one or more decades. Thus, it would be useful to know whether these benefit estimates are not affected by economic cycles.

The paper proceeds as follows. First, we formalize the economic indicators to be compared. Next, we introduce the methods used to estimate those indicators during the 2006 boom year and the Great Recession in summer 2009. We then describe the data, statistical results, and draw conclusions.

Testing for Differences in Visitor Use, Visitor Expenditures and WTP

Sales and Visitor Expenditure Hypothesis Tests

Visitor spending for public land and nature-based recreation can be grouped into several categories. Transportation (e.g., gasoline, airfare, rental cars) and traveler accommodations (e.g., hotels, bed-breakfast) are two of the largest sectors. Other important direct sales to tourists include food establishments (e.g., restaurants), and retail sales.

We compare hiker expenditures for each of the five spending categories to determine whether there has been a statistically significant change in the sum of visitor expenditures between summer 2006 and summer 2009. The general form of our hypothesis test for each expenditure category is:

(1) Ho: $Expend_{i2006} = Expend_{i2009}$ vs Ha: $Expend_{i2006} \neq Expend_{i2009}$

Where $Expend_i$ is visitor expenditures of type i, where i= 1,…5.

We perform this hypothesis test for both total visitor spending in Colorado and visitor spending within 25 miles of our study site, Quandary Peak. For both 2006 and 2009, the majority of expenditures take transpire "within 25 miles" of the study site. This documents the localized spending in the nearby, rural communities. However, expenditures also are made in other mountain communities en route to Quandary Peak. The hypothesis in Equation (1) is further tested using a t-test of difference in means for the two different sample time periods for each spending category.

Willingness to Pay (WTP)

The net WTP or consumer surplus associated with outdoor recreation on public lands in Colorado is more difficult to estimate than visitor expenditures. Given the relatively free access to public lands (Loomis, 2002), there is likely a benefit to visitors from the opportunity to hike on public lands in the Rocky Mountains in excess of their transportation costs and other trip related costs.

In order to measure net WTP, we utilize the contingent valuation method or CVM (Loomis and Walsh, 1997). In particular, we estimate WTP using a dichotomous choice CVM model. This WTP question format asks whether the visitor would pay a specific increase in trip cost, the magnitude of which is varied across the sample). This model is deemed more market-like and analogous to the price taking behavior familiar to consumers than asking an open-ended question of what the maximum amount a visitor would pay (Loomis and Walsh, 1997).

The utility theoretic foundations of the dichotomous choice model have been well developed (see Hanemann, 1984); and will only be summarized here. We assume that an individual's utility is a function of a recreation experience at site R and the consumption of all other goods (represented by income I). The utility function may be represented as:

(1) $U = f(R, I)$

Utility from visiting a recreation site also depends on an individual's personal preferences which are known only to that individual, so a portion of the utility function is not observable to the researcher. Therefore, some components of each individual's utility function are treated as stochastic, resulting in an indirect utility function and a random term, as follows:

(2) $U = f(R, I) = v(R, I) + e$

where "e" represents an error term.

With the dichotomous-choice WTP question format, survey respondents are asked whether or not they would still take their most recent trip to the recreation site if travel costs were $Bid higher. The respondent is predicted to answer "YES", if utility from the recreation experience, along with the associated reduction of $*BID* in income, is greater than the individual's original utility level without taking the trip. The "YES" respondent would take the trip (R = 1) at the higher travel cost (I-$Bid), and the "NO" respondent would choose not to take the trip (R = 0). Therefore, the probability of a "YES" response is represented as follows:

(3) $P(YES|\$Bid) = P[v(R=1, I-\$Bid) + e_1 > v(R= 0, I) + e_2]$

where e_1, and e_2 are error terms with means of zero (Hanemann, 1984).

In the random utility framework, a visitor is predicted to respond "Yes", if the gain in the deterministic part of the utility function (the indirect utility difference) is larger than the difference in the stochastic part ($e_1 - e_2$). If the difference of the errors ($e_1 - e_2$) is logistically distributed, this gives rise to the parametric logit model. The stylized version of the model estimated is:

(4) $Log[(Prob\ YES)/(1-Prob\ YES)] = \beta o - \beta_1(\$Bid) + \beta_2 X_2 \ldots + \beta n(Xn) + \varepsilon$

where $Bid is the increase in trip cost the visitor is asked to pay, X's are other independent explanatory variables, and ε is the error term. This model is estimated using a maximum likelihood estimator.

WTP Model Hypotheses Tests

We test for differences in visitor benefits between 2006 and 2009 by using three hypothesis tests. The first two involve statistical tests on the equality of coefficients in the logit willingness to pay model. We test for this in two ways: (a) pooling the data from the two time periods and including an intercept shifter for the 2009 recession and a bid dummy interaction term. This interaction term allows us to test if the marginal utility of money has changed with the 2009 recession; (b) a likelihood ratio test of equality of logit regression coefficients between 2006 and 2009.

In terms of the first statistical test of the intercept dummy and bid interaction dummy, we estimate the following empirical model:

(5) $\text{Log}[(\text{Prob YES})/(1-\text{Prob YES})] = \beta o - \beta_1(\$\text{Bid}) + \beta_2(2006\text{Dum}) + \beta_3(\$\text{Bid}*2006\text{Dum}) + \varepsilon$

where "2006Dum" =1 if the WTP responses are from 2006, 0 if from 2009.

The hypotheses tests evaluates whether the coefficients on the dummy variable and the dummy variable*$Bid interaction variable, respectively, are statistically significant:

(6a) Ho: $\beta_2=0$ vs Ha: $\beta_2\neq 0$

(6b) Ho: $\beta_3=0$ vs Ha: $\beta_3\neq 0$

These are tested using a t-test on the two coefficients.

The second test uses a Likelihood Ratio Test (Kmenta, 1986) to test for equality of coefficients in the logit WTP models between 2006 and 2009. This approach compares the sum of the log likelihoods of the individual logit models (i.e., the unrestricted coefficient model) to the log likelihood of the pooled logit model (i.e., the model that restricts the coefficients to be the same in the two periods). If this restriction is not rejected, then there is coefficient equality in the two time periods. The Likelihood Ratio Test follows a Chi-Square distribution.

The third test used compares the differences in median WTP between the years 2006 and 2009. The formula for median WTP is given in Hanemann (1989) and adapted here for each of the two time periods as:

(7) Median $WTP_t = (\beta_o/|\beta_1|)$

Where t is 2006 or 2009 logit model.

This calculation evaluates whether median WTP per person per trip is statistically different in 2009 from 2006. Specifically:

(8) Ho: $WTP_{2006} = WTP_{2009}$ vs Ha: $WTP_{2006} \neq WTP_{2009}$

Confidence intervals are calculated for the median WTP (Equation (7)) using the variance-covariance matrix and a procedure adapted to dichotomous choice CVM by Park, Loomis, and Creel (1991), to test whether the confidence intervals on the two estimates of median WTP overlap (Creel and Loomis, 1991).

Data

Quandary Peak, a recreation area southwest of Denver, Colorado, and approximately ten miles directly south of the resort town of Breckenridge, served as the study area. In 2006, visitor surveys were distributed over three days, on two separate non-holiday weekends during August and September 2006. The mail back survey booklet was designed along the lines of Dillman's Tailored Design Method (Dillman, 2000). The 2006 mail back surveys were distributed by two volunteers trained on survey distribution procedures. Hikers were approached at trailheads and in parking lots at the conclusion of their recreation activity. There were no refusals to take the survey in 2006. After providing the visitors with the survey and a postage paid return envelope, names and addresses were also collected so that a second survey could be mailed to non-

respondents. Of the 199 mail back surveys handed out, 129 surveys were returned, for a response rate of 65%.

The 2009 data collection process, including trailhead location and survey distribution procedures, mirrored the 2006 data collection process. In 2009, two individuals were trained in the distribution of surveys: a graduate student, and one of the same volunteers winstrumental in the distribution of the surveys in the 2006 study. As with the 2006 study, visitors were provided with the mail back survey and a postage paid return envelope. Three weeks later, replacement surveys were mailed to non-respondents. A total of 345 surveys were distributed over five weekend days during July and August, 2009. A total of 248 surveys were returned for a response rate of 72%.

The survey included separate sections, described as follows:

Information regarding the specific trip: Seven questions regarding trip purpose and recreational activities.

Trip expenditures: Five questions addressing trip expenditures on the trip in Colorado. Respondents were asked to report the amount that they and members of their parties (e.g., family, companions) spent in each category. To put expenditures on a per visitor basis, these expenditures were divided by the number of people in the group. Asking for expenditures from the entire party and then dividing by group size is the preferred approach to avoid overestimating per person expenditures (Stynes and White, 2006).

Dichotomous Choice Contingent Valuation Question. The WTP question was:

> *As you know, some of the costs of travel such as gasoline, campgrounds, and hotels often increase. If the **total cost** of this most recent trip to the recreation area where you were contacted had been $BID **higher**, would you have made this trip to **this** Fourteener? Circle one: YES NO*

The $BID amount had values ranging from $2 to $950. "Fourteener" refers to the 14,000 foot Quandary Peak that is often the attraction for many of the hikers visiting this area.

2006 and 2009 Visitor Use Estimates Data

Obtaining accurate visitor use estimates for visitation to public lands has been a longstanding challenge (Loomis, 2000). Until the National Visitor Use Monitoring program (NVUM, see English *et al*, 2002), the USDA Forest Service had very inaccurate estimates of overall visitor use. With the advent of NVUM, the agency now has accurate estimates at the National Forest level, but not at specific sites within the National Forest. Further, NVUM only collects the National Forest level data every five years. Thus, we turned to alternative sources of data to estimate visitor use in 2006 and 2009.

The majority of the USDA Forest Service Fourteener visitor use data has been collected by the Colorado Fourteeners Initiative (CFI), a non-profit group that receives project direction and grants from the USDA Forest Service, Rocky Mountain Region. CFI is not viewed as a traditional activism organization, but rather, it is regarded as a non-profit group that assists the USDA Forest Service directly with implementing its Fourteener management plans. Visitor use data gathered by the CFI is mainly the result of a "Peak Stewarding Program", where volunteers and staff members approach visitors, primarily from the parking lot or from the summit.

The USDA Forest Service typically adopts CFI data as a measurement of its visitor use, as the CFI stewardship program provides the most accurate information on visitation use available to the USDA Forest Service. Longitudinal CFI data indicate that visitor use did not decline

between 2006 and 2009. Data reveal that, if anything, visitor use increased from 2006 to 2009. In 2006, CFI Peak Steward results recorded 121 contacts over 2 non-holiday weekend days, (for an average of 60.5 climbers observed per day). Expanding and projecting this data over 32 non-holiday weekend days from June to September (optimal Fourteener climbing months, due to weather), the estimated weekend use data were roughly 1,936 visitors. In 2009, CFI Peak Stewards reported contact with 500 recreators over 6 days, for an average of 83.3 climbers observed per day, or 2,666 visitors over 32 non-holiday weekends. These observations show an increase in visitors in 2009, compared to 2006.

Survey contact rates from our study also reveal numbers that are consistent with Peak Steward data. In 2006, we distributed 199 mailback surveys over 3 weekend days, for an average of 66.3 per day (Keske and Loomis, 2008). In 2009, surveys were handed out at a similar rate (345 surveys handed out over 5 weekend days, for an average of 69 surveys per day). Thus our data confirms that visitor use did not decline during the times of economic recession. If anything, visits to Fourteeners may have increased, possibly as a result of a tendency for people to visit their home state, rather than to undertake more expensive travel out of state (e.g., Alaska) or internationally (Canadian Rockies or the European Alps). This increase in visitation to Colorado 14ers is consistent with increasing visitor use between 2006 and 2009 at Rocky Mountain National Park, northwest of Denver. Rocky Mountain National Park is also contains one Fourteener and is only about 100 miles from our study peak, making it a good visitation comparison for Quandary Peak.

Results

Prior to presenting the expenditure analysis, we wish to note that monetary expenditures in 2009 were converted to 2006 dollars using the Consumer Price Index (CPI).

Expenditure Hypothesis Test Results

Table 1 presents results from the statistical tests for differences between visitor expenditures in 2006 and 2009. We test this for overall expenditures in Colorado, and for visitor expenditures within 25 of our recreation site (Quandary Peak). The five spending categories and miles traveled yield 11 different comparisons. Only two of the 11 were statistically different between 2006 and 2009 at the 5% level of significance. One of those differences was for gasoline purchases within 25 miles of Quandary Peak, which dropped significantly (P=.023). However, difference in gasoline purchases be explained by the observation that fewer miles were driven in 2009, as the price of gasoline increased by a $0.05/gallon according to the American Automobile Association. As can be seen in the last row of Table 1, our conclusions about each category are consistent with the lack of statistical difference in total visitor spending across all categories in Colorado.

Thus, in terms of our hypothesis tests, we fail to reject the null hypothesis of no difference in five individual spending categories and the total visitor expenditures at the state of Colorado level. However, with regard to spending within 25 miles of the recreation site, two of the five visitor spending categories, did decline significantly. Based on analysis of reported expenditures, local businesses such as hotels, restaurants and equipment stores in communities that rely on nature-based tourism may not have been hard hit by the Great Recession. Gas stations and convenience

stores where supplies are purchased, however, experienced a significant drop in sales immediately surrounding the site, but not in the state of Colorado as a whole. While we do not formally test whether Fourteener recreation is a normal or inferior good, the expenditures indicate that Fourteener recreation might reflect a normal good. Two categories of expenditures dropped during 2009 and three did not change. However, it is difficult to draw conclusions about this finding, because visitation at our study Fourteener and Rocky Mountain National Park increased during the recession.

TABLE 1

Comparison of 2006 and 2009 Per Trip Hiker Expenditures within 25 miles of Quandary Peak and in the State of Colorado ($2006)

Category	**2006 Mean**	**2009 Mean**	**T-Statistic (P-value)**
Miles Driven	264	214	1.12 (.267)
Gasoline Purchases:			
Within 25 miles of site	$30.37	$18.35	**2.82 (.023)**
In Colorado	$61.04	$42.00	1.69 (.092)
Retail Supplies			
Within 25 miles of site	$7.80	$1.80	**2.78 (.01)**
In Colorado	$13.24	$15.85	-.363 (.717)
Equipment Purchases			
Within 25 miles of site	$15.26	$12.80	.389 (.69)
In Colorado	$25.14	$28.28	-.441 (.659)
Hotel			
Within 25 miles of site	$69.12	$61.11	0.41 (.68)
In Colorado	$81.62	$129.40	-1.29 (.196)
Food in Restaurants			
Within 25 miles of site	$60.33	$47.52	1.15(.25)
In Colorado	$78.32	$80.48	-.401 (.689)
Total Expenditures			
In Colorado	$246.11	$271.17	-.760 (.447)
Est. Total Seasonal Use*	1936-2126	2208-2665	NA
Est. Total Expenditures in Colorado*	$476,469-$522,147	$543,411-$665,031	NA

* Range of visitor use estimates calculated from our survey and that of Colorado Fourteeners Initiative for 32 non-holiday weekend days. Total expenditures reflect spending within Colorado.

WTP Model Hypotheses Test Results

Table 2 presents the results of the logit model, which pools visitor WTP responses for 2006 and 2009. As expected, the key price coefficient, the $Bid Amount, is negative and statistically significant. This serves as a simple validity check, indicating respondents were paying attention to the magnitude of the dollar amount they were asked to pay, as the higher that dollar amount, the lower the probability they would pay. The pooled data model has an intercept dummy variable for 2006, as well as the dummy interacted with the $Bid variable. In terms of our first hypothesis test, we find that the coefficient on the 2006 intercept dummy is not significant (p=.5033). The interaction of 2006 dummy*$Bid coefficient is also not statistically significant (p=.6667). Therefore, we fail to reject the null hypothesis that there is a difference in the 2006 and 2009 WTP logit coefficients.

TABLE 2

Logit WTP Model Results

Constant	1.162***
(T-statistic)	(5.82)
$ Bid Amount	-0.004846***
	(-6.722)
2006 Dummy	0.2358
	(.669)
(2006 Dummy* $Bid)	-0.00134
	(-.4306)
McFadden R-squared	.24
Log likelihood	-188.075
LR statistic	118.799
Probability (LR statistic)	0.000
N	358

*** statistical significance at 1% confidence level

The Likelihood Ratio Test was used to evaluate the second hypothesis test, reflecting the equality of logit WTP model coefficients between 2006 and 2009. The calculated Chi-square of .8747 is not statistically significant at conventional significance levels. Thus we fail to reject the second null hypothesis of coefficient equality in the logit WTP model coefficients.

Results also indicate no statistical difference in WTP in hypothesis three. The same individual logit models were employed using the Likelihood Ratio Test to calculate mean WTP in both 2006 and 2009 . The value per person per trip was $129 in 2006 and $120 in 2009. This is a 7% difference in WTP that is not statistically different at conventional significance levels. Thus we fail to reject the null hypothesis of equality of WTP.

Perhaps one explanation for these results of no statistical difference in visitor spending and logit willingness to pay is that hikers visiting these Colorado mountains did not experience a large reduction in income during this recession in 2009 as compared to 2006. Our data indicates that average household income from the 2006 study was $108,733. In 2009 it fell to $102,968 in 2006 dollars. While this is a 5.3% drop in income, the t-test yields a t-statistic of .21, with associated p-value of .42, indicating no statistical difference in household income in real terms between the two time periods. The income of visitors to Quandary Peak in 2009 is similar to what the inflation adjusted income of visitors to Rocky Mountain National Park. The average incomes for Rocky Mountain National Park visitors were $87,060 in 2002, or $103,500 in 2009 dollars. Thus, other significant alpine day hiking areas attract a similarly high income group of visitors. The relatively high income level of the Park visitors may also explain why visitation to

Rocky Mountain National Park increased in 2009 (285.6 million visits) as compared to 272.6 million visits in 2006, a further indicator that park visitation might be an inferior good.

However, income is only one measure of economic prosperity. We might have expected the large drop in wealth via the fall of the stock market and housing values to cause some retraction in spending and respondents' willingness to pay higher trip costs. These drops in the stock market and housing values would especially be of concern to higher income individuals, as they typically have substantial holdings in the stock market. Thus they might have felt a psychological impact on their wealth, which may have reduced their willingness to pay for recreation in 2009. However, this phenomenon did not manifest itself in nature-based recreation at this location of Colorado.

Conclusions

This study uses data collected from hikers in Colorado to conduct a comparison of 2006 and 2009 visitor spending at the state level and local community level (within 25 miles of Quandary Peak). At the state level there is no statistically significant reduction in expenditures between 2009 and 2006. Spending within 25 miles of Quandary Peak exhibits a statistically significant reduction in gasoline expenditures. The reduction in gasoline expenditures may be a reflection of the 50 mile average reduction in distance travelled in 2009 relative to 2006. This drop in mileage appears to explain most of the drop gasoline spending, from $61 in 2006 to $42 in 2009, because there is only a nickel per gallon difference in gasoline between the two years. The only other statistically significant decrease in visitor spending within 25 miles of the site is in retail supplies.

Other categories of state-wide and local visitor spending show little or no change from before the recession. When adjusted for the modest amount of inflation during these years, there is a very slight increase in visitor spending for trip related equipment, retail supplies, and restaurant meals, none of which are statistically significant. The greatest change in expenditures is statewide visitor expenditures on hotels, which show an average ***increase*** from $81 in 2006 to $129 in 2009, but this is not significantly different at the 10% level. Further there is no statistically significant ($p=0.44$) change in overall total visitor spending in Colorado when summed across all expenditure categories.

Based on our data, we conclude that total visitor spending on nature-based tourism remained remarkably stable during this time period. Two sources of visitor data suggest that visitor use did not decrease between 2006 and 2009, and if anything, visitor use may have increased. The combined effect of no decrease in either visitation and little or no decrease in expenditures per visit leads us to conclude that, at least in Colorado, nature-based tourism such as high mountain recreation appears to be fairly recession proof. Our findings are consistent with the stable visitor use levels at Rocky Mountain National Park, about 100 miles away from our study site. From these findings, we may conclude that rural and public-lands based economies that have tried to diversify from sole reliance on commodity extraction to include nature-based recreation appear to have made a smart move.

The benefits to the visitors themselves, as measured by net willingness to pay, show about a 7% change from $129 per person per trip in 2006 to $120 in 2009. This difference is not statistically

significant at conventional significance levels. Thus, despite a doubling in the unemployment rate and a 50% drop in the stock market, WTP is quite similar in the two time periods. Thus, for public lands management agencies who are required to develop long term (10-15 year) plans, it may not be unreasonable for them to presume that recreation benefits over such a long time period are fairly stable. That is, while there will likely be economic downturns and booms during a 15 year planning horizon, the economic efficiency benefits to public lands visitors such as hikers, will not change significantly during that time period. This stability also bodes well for benefit transfer, as many of the original empirical studies have often been done at different points in the business cycle.

Of course there are limitations to any study, and ours is no exception. It would be beneficial to have such studies before and during the recession for other public lands based recreation to see if this same pattern is observed. Unfortunately, longitudinal data is rare in recreation studies. While hiking is one of the most popular public lands based recreation activities, it would be desirable to have data on other recreation activities such as water-based recreation as well. These limitations point to important avenues for future research.

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