Economic Contribution of Off-Highway Vehicle Recreation in Colorado

2014-2015 Season

A joint cooperation report

TRAILS PRESERVATION ALLIANCE
www.ColoradoTPA.org

www.COHVCO.org
Protecting **YOUR** motorized off highway access to public lands.

COLORADO PARKS & WILDLIFE
COLORADO OHV REGISTRATION DOLLARS AT WORK

Page intentionally left blank to accommodate double-sided printing

December 6, 2016

Economic Contribution of Off-Highway Vehicle Recreation in Colorado

Prepared For:

Colorado Off-Highway Vehicle Coalition
P.O. Box 741353
Arvada, Colorado 80006

Prepared By:

Pinyon Environmental
9100 West Jewell Avenue
Lakewood, Colorado 80232

Acknowledgements: The project team would like to thank Dr. Glenn Haas, Professor Emeritus, Colorado State University for his review and comments on the study.

Page intentionally left blank to accommodate double-sided printing

Pinyon

Executive Summary

Colorado offers unique opportunities for motorized recreation throughout much of the state. As such, the sport and industry of motorized recreation has increased in popularity in Colorado, both for residents and non-residents. Pinyon Environmental Inc. evaluated the economic contribution of motorized recreation throughout Colorado for the 2014–2015 season.

Households that Participate in Motorized Recreation

Colorado Parks and Wildlife reported that over 170,000 off-highway vehicle (OHV) registrations and use permits were issued in Colorado during the 2014–2015 season. The registration and use permit data was used to estimate the number of Colorado resident and non-resident households participating in motorized recreation in 2014–2015. For the purposes of this study, motorized recreation was categorized into three vehicle types: OHVs; four-wheel drive vehicles (4WDs); and snowmobiles. OHVs include all-terrain vehicles (ATVs), utility task vehicles (UTVs), dirt bikes, side-by-sides, and other multi-wheeled vehicles. The 4WD category consists of trucks, pickups, jeeps, and sport-utility vehicles (SUVs). An estimated 8.6 percent of residential households in Colorado participated in motorized recreation in Colorado for the 2014–2015 season.[1] Roughly 30,000 non-resident households participate in OHV recreation in Colorado.

Between 2000 and 2014, OHV registrations for residents increased by 219 percent while OHV permits for non-residents increased by over 1,607 percent. While most of the growth occurred before the Great Recession, registrations did not decline significantly due to economic conditions. Snowmobile registrations for residents fluctuated between 2000 and 2014, with a high of 34,262 in 2003 and a low of 28,023 in 2013. However, snowmobile permits for non-residents have increased from 2003 to 2014 by 493 percent

Expenditures Associated with Motorized Recreation

During the 2014–2015 season, motorized recreational enthusiasts[2] spent an estimated $1.6 billion while taking trips using motorized vehicles for recreational purposes. More than 92 percent of these expenditures occurred during the summer recreational season. In addition to spending money on trips, households that participate in motorized recreation also spend money on maintenance, repairs, accessories, vehicle storage, and miscellaneous items associated with their vehicles. Motorized recreational enthusiasts spent more than an estimated $724 million annually on various items to support and enhance their experiences in Colorado, including $163 million in new vehicle purchases. In total, motorized recreational enthusiasts were responsible for $2.3 billion in direct expenditures related to motorized recreation in Colorado during the 2014–2015 season.

Total Economic Contribution Associated with Motorized Recreation in Colorado

OHV enthusiasts were estimated to generate $914 million in direct sales, an additional $882 million in indirect and induced sales, for a total of $1.8 billion in total sales. Motorized recreation in Colorado is directly or indirectly responsible for almost 17,000 jobs and $671 million in labor income. The economic contribution is distributed by OHVs (ATVs, UTVs, and dual sport/dirt bikes), snowmobiles, and 4WDs. OHV participants contribute 72.8 percent of total gross sales while snowmobiles and 4WDs contribute 6.6 percent and 20.6 percent, respectively.

---

[1] Uses data from the 2010 U.S. Census (Summary File 1) on the total number of households in Colorado of 1,972,868.

[2] These estimates do not include any type of motorized water-based recreational activities.

Table of Contents

Tables

Figures

Appendices

Pinyon

1. Introduction

Colorado offers unique opportunities for motorized recreation throughout much of the state. As such, the sport and industry of motorized recreation has increased in popularity in Colorado, both for Colorado residents and residents of other states. Pinyon Environmental Inc. (Pinyon) evaluated the economic contribution of motorized recreation throughout Colorado for the 2014–2015 season. This report is a summary of the results.

In 2001, the Colorado Off-Highway Vehicle Coalition (COHVCO) funded a study to evaluate the economic contribution of off-highway vehicle (OHV) recreation in Colorado. The 2001 study[3], estimated that total sales associated with motorized recreation in Colorado ranged between $204 and $231 million in 2000. These sales supported between 3,100 and 3,500 jobs and between $95 and $107 million in labor income. The results demonstrated the importance of this OHV recreation to the economy of Colorado, especially in rural areas that heavily depend on outdoor recreation activities.

The current study used an online survey of motorized recreationists in Colorado to estimate average expenditures during recreational trips or outings, as well as other annual expenditures needed to maintain equipment and vehicles. Pinyon used average expenditures in combination with the estimated number of people engaged in OHV activities and the average number of trips taken in Colorado on an annual basis to estimate annual expenditures. Pinyon then used the total expenditures with economic multipliers to estimate total economic contribution in terms of sales, employment, income, and taxes. The information from this survey, including average trips, average trip and annual expenditures, along with the number of households that participate in motorized recreation in the state were used to estimate the total economic contribution of OHV recreation in Colorado during the 2014–2015 season. For purposes of this analysis, motorized recreation can include recreation on a variety of vehicles including all-terrain vehicles (ATVs), dirt bikes, snowmobiles, four-wheel drive vehicles (4WDs), side-by-sides, and other vehicles designed for off-highway recreation.[4]

This report is organized into the following sections. Section 2 explains the approach used by Pinyon to estimate the economic contribution of OHV recreation in Colorado. Section 3 summarizes the total economic contribution of motorized recreation in Colorado during the 2014–2015 season, and section 4 provides a regional analysis for Colorado based on survey information on where the trip expenditures are spent within the state.

[3] Hazen and Sawyer, Economic Contribution of Off-Highway Vehicle Use in Colorado, July 2001, Hollywood, Florida.

[4] This study did not consider any motorized boat or water craft use in the estimates of economic contribution of motorized recreation.

2. Approach

To provide a more current estimate of the economic contribution of motorized recreation in Colorado, the study included:

- Development of an online survey of resident and non-resident motorized recreators to determine such things as average annual trip and non-trip expenditures related to motorized recreation, average number of trips (day and overnight) and destinations, and number and types of vehicles used for motorized recreation.
- Collection of additional information on new and used vehicle sales.
- Update of total population estimates of motorized recreators in Colorado or traveling to Colorado by vehicle type including: ATVs, utility task vehicles (UTVs), snowmobiles, motorcycles and dirt bikes and 4WDs.
- An estimate of the economic contribution of motorized recreation in Colorado using current economic multipliers. The project team used the IMPLAN® Pro (IMPact Analysis for PLANning) model to estimate economic multipliers for Colorado.
- An excel model was used to estimate employment, income, sales and taxes generated by the economic activity tied to motorized recreation in Colorado.

The following sections provide additional detail on the approach used for this study.

2.1 Motorized Recreation Survey

Pinyon used an online survey to collect information on the behaviors of individuals engaged in motorized recreation to estimate the economic contribution of this activity during the 2014–2015 season. The project team designed three separate survey instruments to collect data and information from different motorized recreational user groups and activities:

- ATVs, recreational off-highway vehicles, (ROVs) and dirt bikes and dual-purpose motorcycles,
- 4WD jeeps, automobiles, pickups or sport utility vehicles (SUVs), and
- Snowmobiles

The project team designed and tested the survey instruments used to collect information from recreators regarding their motorized recreational experiences in Colorado. The survey questions covered general topics such as:

- Types of vehicles used for motorized recreation
- Locations where motorized recreation enthusiasts recreate
- The number of trips taken per year for motorized recreation
- Average expenditures related to motorized recreation
- Demographic information

Pinyon used proper design and testing techniques to develop survey instruments to minimize bias and generate appropriate information that was used to estimate the economic contribution of motorized recreation in Colorado.

Sample Size

The project team estimated the appropriate sample size for each survey instrument based on the number of OHV households. Sample size for each survey instrument was determining using the following equation:

$$n = \frac{Z_\alpha^2\,[p(1-p)]N}{Z_\alpha^2[p(1-p)] + (N-1)C_p^2}$$

Where,

$Z_\alpha^2 =$ Z score for the level of confidence
$C_p^2 =$ margin of error

$p =$ represents the proportion that would result in the largest sample size (Rea and Parker, 1997[5])

For this analysis, the project team assumed a 95 percent confidence interval with a margin of error of five percent. The desired number of completed surveys was estimated (sample size) using the above equation and the number of households that participate in OHV recreation as discussed above and as summarized in Table 2-1.

Table 2-1. Estimated Survey Sample Sizes

Vehicle Type	Estimated number of Households that Participate in OHV Recreation	Estimated Sample Size (95% Confidence Interval and 5% Margin of Error)
Dirt Bikes and Dual-Purpose Motorcycles, ATVs, and ROVs	142,500	383
Snowmobiles	12,500	373
4WDs	35,000	380

Survey Implementation

The project team used an online survey service (Survey Monkey) to administer the three survey instruments. Although a number of online services could administer the survey, the study team felt Survey Monkey is the most flexible, cost effective tool available to meet the needs of the study. After finalizing the survey instruments, the project team entered individual questions into Survey Monkey. The website then generated a link that was sent by email or posted to websites for easy access from users. The project team then worked with COHVCO and other motorized recreation user groups to distribute the link to potential recreators and to encourage participation. Recreators were directed to complete the survey online with their responses entered into a database for further statistical analysis.

[5] Louis M. Rea and Richard A. Parker, *Designing and Conducting Survey Research*, Second Edition. Jossey-Bass Publishers. 1997.

The online surveys for motorcycles, ATVs and ROVs, and 4WDs was administered from November 2015 to February 2016 until the desired sample size was reached. The snowmobile survey was administered from February 2016 to March 2016 to coincide with the winter recreation season. In total, 1,800 completed surveys were received.

2.2 Estimating Economic Contribution

Using the results of the survey, the project team estimated the economic contribution of motorized recreation in Colorado following these steps.

Step 1 Estimate the number of households that participate in motorized recreation in Colorado.

Step 2 Estimate the total expenditures for trips made while participating in motorized recreation in Colorado.

Step 3 Estimate annual expenditures related to maintenance and support of motorized vehicles and activities.

Step 4 Estimate the new sales of OHVs in Colorado.

Step 5 Estimate the economic contribution to Colorado through total expenditures and purchases made by OHV enthusiasts.

Estimate the Households that Participate in Off-Highway Vehicle Recreation

To determine the number of households[6] that participate in motorized recreation in Colorado, the project team obtained data from the Colorado Parks and Wildlife (CPW) on OHV registrations and use permits. The CPW administers Colorado's statutorily created OHV Program,[7] which requires OHV registration for all motor vehicles that are not licensed for public road access but are used on designated OHV trails and routes in Colorado. In addition, motorized vehicles that are street-legal or owned by out-of-state residents must have an OHV use permit if these vehicles are operated on designated trails or routes in Colorado.

CPW reported that over 170,000 OHV registrations and use permits were issued in Colorado during the 2014–2015 season (CPW, 2015).[8] Between 2000 and 2014, OHV registrations for residents increased by 219 percent while OHV permits for non-residents increased by over 1,607 percent. Most of the growth occurred between 2000 and 2008. Snowmobile registrations for residents fluctuated between 2000 and 2014, with a high of 34,262 in 2003 and a low of 28,023 in 2013. A downward trend for registrations is shown from 2007 to 2013. However, snowmobile permits for non-residents have increased from 2003 to 2014 by 493 percent (Figure 2-1 and Figure 2-2).

---

[6] For purposes of this study, household is defined as all persons who occupy a housing unit as their usual place of residence (U.S. Census, American Community Survey).

[7] Colorado's OHV program was statutorily created in sections 33-14.5-101 through 33-14.5-113 in the Colorado Revised Statutes.

[8] Colorado Parks and Wildlife, Off-Highway Vehicle (OHV) Program, Accessed at: http://cpw.state.co.us/aboutus/Pages/OHV-Progam.aspx.

Figure 2-1. Recreational Off-Highway Vehicle Registrations and Permits in Colorado

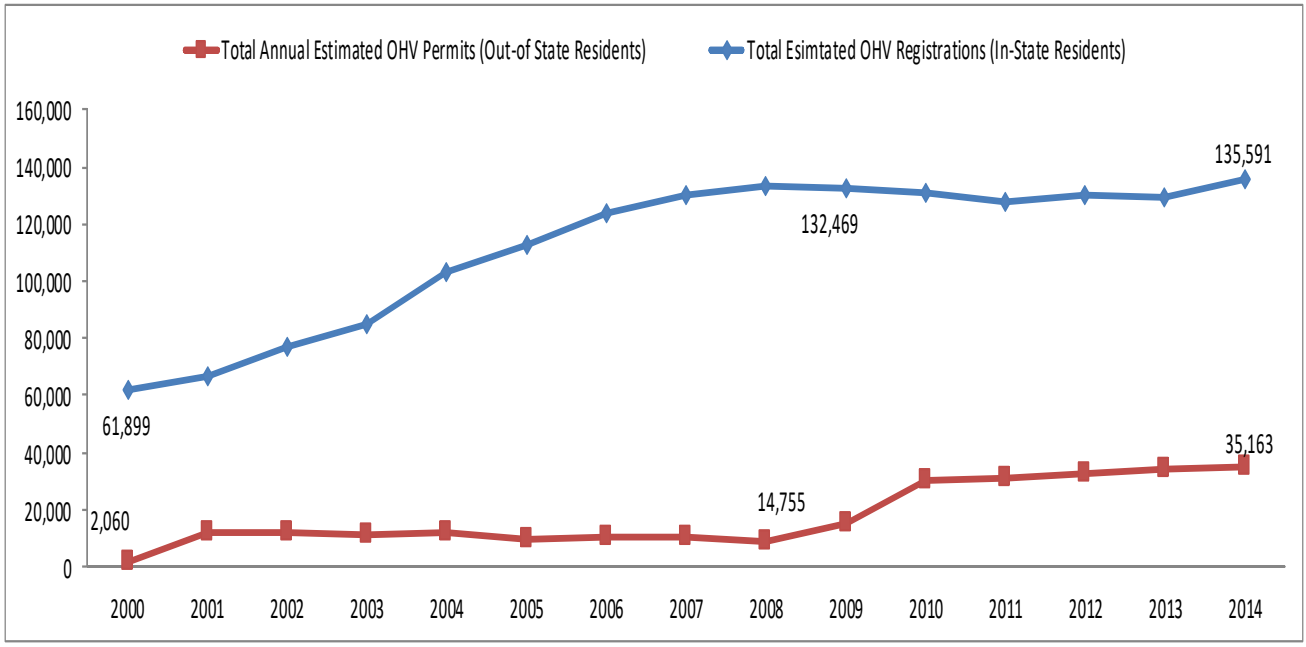
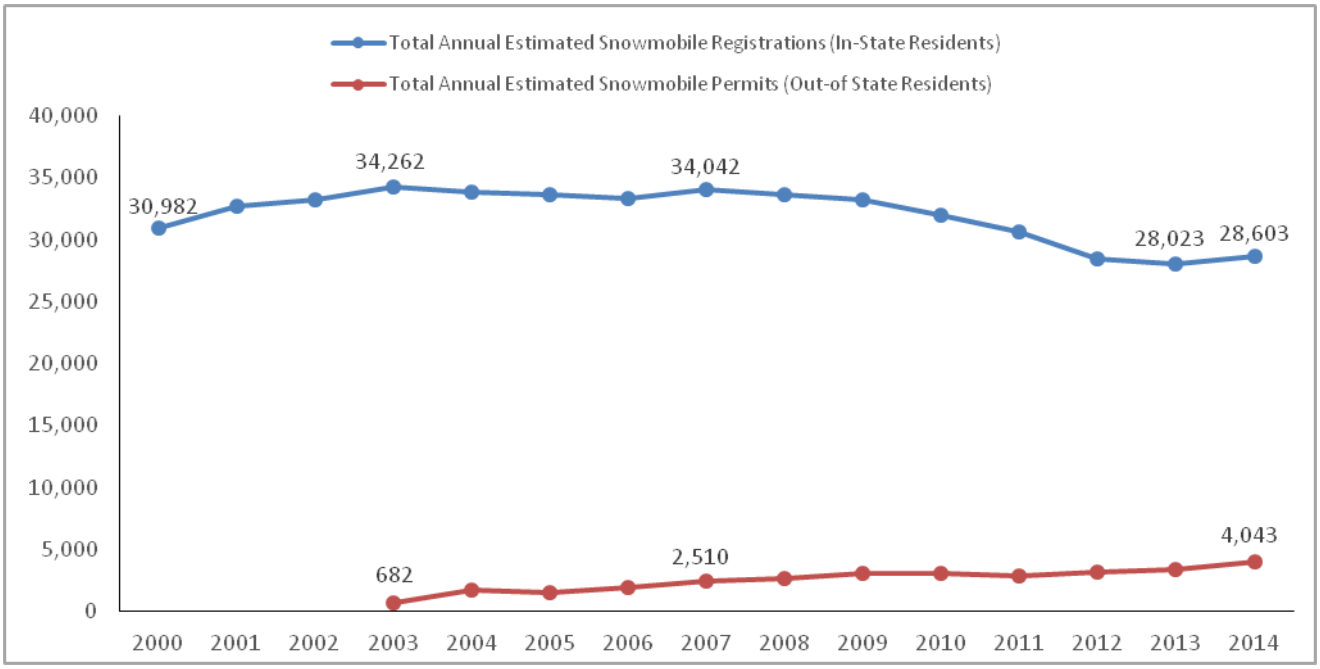


Figure 2-2. Recreational Snowmobile Registrations and Permits in Colorado



The project team further analyzed the data on OHV registrations and use permits to estimate the number of households that participate in OHV recreation. Residential households are those that have registered their OHVs using in-state registrations, whereas non-residents are required to purchase out-of-state permits. For the 2001 study, Hazen and Sawyer obtained the full registration database from Colorado State Parks. The database included names and addresses for each permit issued by the OHV program. Hazen and Sawyer sorted the database to include only unique residential addresses, partially by eliminating any commercial operations and multiple vehicles registered to one household. The 2001 study estimated that 79 percent of the total number of ATVs, UTVs, and dirt bike registrations in Colorado were registered to a unique residential household that potentially used their vehicle for recreation.

Data provided by CPW for the current study includes total number of registrations and use permits by vehicle type. Therefore, the analysis completed for the 2001 study to determine the unique number of households cannot be replicated. As such, the project team assumed that the same proportion of unique households own and use motorized vehicles for recreation in 2014-2015 as in 2000. Thus, the same proportion (79 percent) was applied to the 2014 vehicle registrations to estimate the number of households participating in motorized recreation for 2014–2015 season for ATVs, UTVs, and dirt bikes. The number of Colorado households that recreationally use ATVs, UTVs, and other multi-wheeled OHVs was estimated to be 104,916. In addition, the project team accounted for the number of households that actually used their motorized vehicles for recreation (98 percent) during the 2014–2015 season based on survey responses.

CPW provided the total number of snowmobile registrations for 2014. The number of Colorado registrations was 28,603, and the number of non-resident registrations was 4,043. In the 2001 study, 48 percent of all snowmobile registrations in Colorado were registered to a unique residential household that likely used their vehicle for recreation. This same proportion was applied to the total number of snowmobiles registered in Colorado during the 2014–2015 season, resulting in 13,729 households that potentially participate in snowmobile recreation. Pinyon adjusted this further based on 94 percent of survey respondents indicating that they participated in snowmobile recreation during the 2014–2015 season. For this study, all non-resident permits were assigned to unique households.

It is widely understood that 4WDs are not only used for recreation but are often used for business, commuting, and other work-related or personal reasons. This is particularly the case for 4WDs such as pickups and SUVs. This study is focused on evaluating the number of households that use 4WDs for motorized recreation. The number of households using 4WDs for motorized recreation was estimated using information provided from the Colorado Department of Revenue (CDOR). The information was gathered from the CDOR's 2015 Annual Report,[9] which summarizes the number of registered vehicles by vehicle type for 2014. Using the method consistent with the 2001 study, 923,479 resident households owned 4WDs in 2014. This was adjusted to account for the percentage of households that use their vehicles for motorized recreation. Using assumptions from a California study, it was assumed that 14.2 percent of Colorado households use their 4WDs for motorized recreation.[10] This estimate was further adjusted based on survey responses indicating 98 percent participated during the 2014–2015 season and 2.5 vehicles per household, resulting in 51,332 households. Data were not available to estimate the number of non-resident households who use their 4WDs for motorized recreation in Colorado. The estimated non-resident participants provided in Table 2-2 was obtained from the 2001 study, an estimate of 3,500 non-resident households participate in motorized recreation using 4WD vehicles.

---

[9] Colorado Department of Revenue, "Colorado Department of Revenue 2015 Annual Report, July 1, 2014 – June 30, 2015", available at: https://www.colorado.gov/pacific/sites/default/files/2015%20Annual%20Report_1.pdf.

[10] Tyler Associates for the California Department of Transportation in Cooperation with the Department of Parks and Recreation, "A Study to Determine Fuel Tax Attributable to Off-Highway and Street Licensed Vehicles used for Recreation Off-Highway," Corte Madre, California, November, 1990.

The resident and non-resident households participating in motorized recreation in 2014–2015 are summarized in Table 2-2. Approximately 8.5 percent of residential households in Colorado were estimated to participate in motorized recreation in Colorado during the 2014–2015 season.[11] Roughly 30,000 non-resident households came from out-of-state to participate in motorized recreation.

Table 2-2. Number of Resident and Non-Resident Households Participating in Motorized Recreation in Colorado in 2014–2015

Households	OHVs	Snowmobiles	4WDs	Total All Vehicles
Colorado Resident Households	104,916	12,934	51,332	169,181
Non-Resident Households	22,604	4,043	3,500	30,147

2.3 Trip and Annual Maintenance Expenditures

Motorized recreation contributes to the economy when motorized recreational enthusiasts purchase retail items, hotel and motel accommodations, or they spend money to operate and maintain their vehicles. For this study, expenditures are separated into two types:

- **Trip expenditures—**expenditures made by motorized recreational enthusiasts while using their vehicles on trips.
- **Annual expenditures—**expenditures on maintenance, repairs, and other accessories that support motorized recreation.

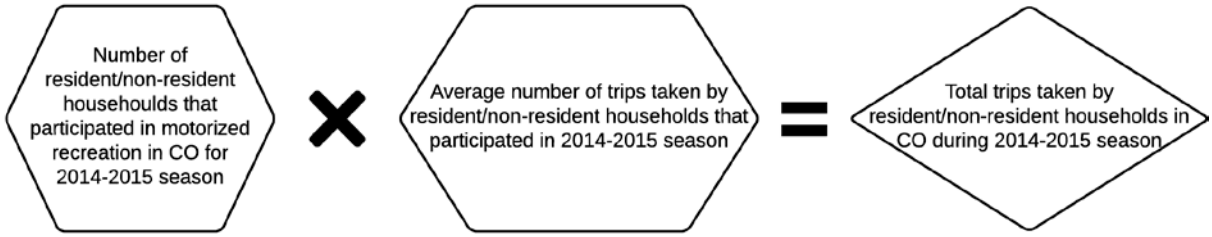
Methods used to estimate these types of expenditures are discussed below.

Trip Expenditures

The first step in estimating total trip expenditures required the project team to estimate the number trips taken by resident and non-resident households for motorized recreational activities during the 2014–2015 season. Pinyon estimated the number of trips, using data obtained from the surveys, for each vehicle type (Figure 2-3).

[11] Uses data from the 2010 U.S. Census (Summary File 1) on the total number of households in Colorado of 1,972.868.

Figure 2-3. Trips Taken by Resident and Non-Resident Households in Colorado during the 2014–2015 Season



The total number of trips taken by resident and non-resident households for motorized recreation in Colorado during the 2014–2015 season for each of the three vehicle types is summarized in Table 2-3.

Table 2-3. Number of Trips for Resident and Non-Resident Households

Households	OHVs	Snowmobiles	4WDs	Total All Vehicles
Colorado Resident Households	1,783,567	194,012	769,974	2,747,533
Non-Resident Households	192,137	46,495	25,358	263,358

Total trip expenditures (direct sales) were estimated by multiplying the number of trips taken by resident and non-resident households during the 2014–2015 season by the average trip expenditures. Average trip expenditures were obtained from the online survey of motorized recreation users. A summary of the average itemized expenditures used for this analysis is provided in Appendix A.

Total trip expenditures for resident and non-resident households are summarized in Table 2-4. Trip expenditures are specified as summer and winter use. Summer use includes all ATVs, UTVs, dirt and dual-purpose bikes, and 4WDs, while winter use includes snowmobile activities. During the 2014–2015 season, motorized recreational enthusiasts spent an estimated $1.6 billion when taking trips to use their motorized vehicles for recreational purposes. More than 92 percent of these expenditures occurred during the summer recreational season.

Table 2-4. Total Trip Expenditures 2014–2015 Season

Expenditure Category	Season of Use		Total
	Summer (OHVs and 4WDs)	Winter (Snowmobiles)	
Gasoline/oil for motorized recreational vehicles	$228,776,461	$22,768,931	$251,545,392
Gasoline/oil for tow vehicles	$283,433,689	$25,428,805	$308,862,495
Restaurant/lounge purchases	$246,340,805	$22,313,177	$268,653,983
Food and beverages purchased at grocery and/or convenience stores	$234,149,983	$14,503,707	$248,653,690
Overnight accommodations	$318,929,344	$28,705,452	$347,634,796
Guides and tour packages	$15,646,136	$2,862,182	$18,508,318
User fees and donations	$78,915,857	$1,645,596	$80,561,453
Souvenirs, gifts, and entertainment	$60,927,214	$4,994,178	$65,921,392
Other trip-related expenses	$52,252,465	$4,007,419	$56,259,884
Total	**$1,519,371,954**	**$127,229,447**	**$1,646,601,401**

Annual Expenditures

In addition to spending money on recreational trips, households participating in motorized recreation spend money on maintenance, repairs, accessories, storage, and miscellaneous items associated with their vehicles. These annual expenditures made in Colorado were estimated for this study for both resident and non-resident households.[12]

Average annual expenditures were obtained from the online survey responses. The average itemized expenditures for resident and non-resident households used for this analysis are shown in Appendix A. Motorized recreational enthusiasts are estimated to have spent more than $724 million annually on various items to support and enhance their experiences in Colorado. Annual expenditures by all vehicles types for the 2014–2015 season are summarized in Table 2-5.

[12] Annual expenditures were estimated for non-resident households but were not included in the analysis under the assumption that most of those annual expenditures would occur in their home state.

Table 2-5. Annual Expenditures by Vehicle Type for 2014–2015 Season

Expenditure Category	OHVs	Snowmobiles	4WDs	Total All Vehicles
Repairs and parts	$107,149,307	$14,842,446	$100,276,524	$222,268,277
Vehicle storage	$9,674,548	$1,351,471	$4,540,743	$15,566,763
Motorized Recreational Accessories	$55,933,276	$6,341,578	$65,807,398	$128,082,252
Clothing	$38,839,206	$426,952	$135,575	$39,401,734
Safety Equipment	$33,760,993	$5,204,546	$17,600,476	$56,566,015
Annual Insurance	$23,172,871	$2,827,302	$28,055,200	$54,055,373
Registration or Permit fees	$10,779,612	$911,459	$7,191,848	$18,882,918
Club Memberships	$5,515,631	$563,074	$1,870,658	$7,949,364
Magazine Subscriptions	$1,643,288	$148,052	$644,871	$2,436,211
GPS, Maps, Software	$88,041	$1,320,914	$350,626	$1,759,581
Other items	$5,025,536	$470,568	$9,247,356	$14,743,460
Vehicle sales	$125,043,120	$22,160,000	$15,979,632	$163,182,752
Total	**$416,625,429**	**$56,568,363**	**$251,700,907**	**$724,894,699**

2.4 Estimate New Vehicle Sales

Pinyon used information from a number of sources to estimate sales of new vehicles used for motorized recreation in Colorado during 2014–2015 season. Data were obtained from the Motorcycle Industry Council on the number of dirt bikes and ATVs purchased in 2015. The retail price of these vehicles was obtained from various Colorado dealerships and internet sources. Data on the number of snowmobiles sold in Colorado and the average price were obtained from the International Snowmobile Manufacturers' Association for the 2014–2015 season. The number of UTVs sold and average retail prices were obtained through Colorado dealerships and internet sources.

Additional information and assumptions on new sales of 4WDs was obtained from the 2001 survey. In the 2001 study, 11 percent of households using 4WDs for motorized recreation purchased new 4WDs on an annual basis. For this analysis, Pinyon used a more conservative estimate of one percent of households would purchase a new vehicle for motorized recreation based on current survey data and assumptions.

3. Economic Contribution of Off-Highway Vehicle Recreation in Colorado

Pinyon estimated the total economic contribution of motorized recreation in Colorado by applying the expenditures estimated and discussed in the previous sections to an input-output (I-O) model relevant to Colorado. I-O modeling is a systematic method to describe the flow of money between production and consumption sectors within a particular economy through a series of linkages among industries, institutions, and households. For this analysis, IMPLAN® Pro was used which is an I-O dataset and model that is widely used by industry and governments. It provides I-O multipliers used to calculate the total direct, indirect and induced sales, income, employment, and business taxes resulting from the expenditures made by OHV enthusiasts.[13]

Direct, indirect, and induced contributions are defined as follows.

- **Direct**—represents the response (e.g., employment) in the economy to the industry affected by the purchase of a good or service.
- **Indirect**—represents responses of industries supporting the directly affected industries in providing inputs for final goods and services.
- **Induced**—represents the response of increased household income (spending) resulting from direct and indirect effects.

Income and taxes generated from motorized recreation include labor income, employee compensation, proprietor income, value added or gross regional product (GRP), and business taxes. Definitions for each income type estimated during this study are included below.[14]

- **Labor Income**—employee compensation and proprietor's income, as defined below.
- **Employee Compensation**—the total wages and salaries of workers who are paid by employers, as well as the value of benefits such as health care and life insurance, retirement payments, and non-cash compensation.
- **Proprietor's Income**—payments received by self-employed individuals as income.
- **Gross Regional Product (GRP) (Value Added)**—the combination of labor income, other property type income and indirect business taxes. Value added accounts for all non-commodity payments associated with an industry's production in a geographic area. For purposes of this study, the geographical area is defined as the state of Colorado.
- **Business Taxes**—excise taxes, property taxes, fees, licensing, and sales taxes paid by businesses.

13 IMPLAN (IMPact Analysis for PLANning) was originally developed by the U.S. Forest Service in conjunction with the Federal Emergency Management Agency (FEMA) and the Bureau of Land Management to assist in land and resource management planning and has been in use since 1979. IMPLAN is widely used for economic analyses by clients in federal, state and local governments, universities, as well as the private sector. The IMPLAN software package allows the estimation of the multiplier effects of changes in final demand for one industry's output and the corresponding effect on all other industries within a local economic area. Multipliers capture all three effects (direct, indirect and induced) and further account for commuting, social security and income taxes, and savings by households. Data output consists of estimations of output, income and employment, and value added.

14 Day, Frances, "Principles of Impact Analysis and Implan® Applications", First Edition.

Employment estimated in this study includes the number of part and full-time jobs generated by activities associated with motorized recreation.

3.1 IMPLAN® Pro Approach

The state IMPLAN® Pro model for 2015 was used to estimate the economic contribution to the state of Colorado. Trip and annual expenditures were mapped to sectors in IMPLAN® Pro as summarized in Table 3-1.[15] The IMPLAN® Pro model was used to estimate jobs, labor income, value added, and sales associated with the motorized expenditures using industry ratios, commuting information, a trade flows model, and multipliers derived from the I-O modeling methods.

Table 3-1. Expenditures Categories Mapped to IMPLAN® Pro Sectors

Expenditure Category	IMPLAN® Pro Sector Number	IMPLAN Sector Name
Repairs and parts, motorized recreational accessories, clothing, safety equipment, and other items	396	Retail -- Motor Vehicles
Vehicle storage	440	Real Estate
Insurance	437	Insurance Carriers
Registration or permit fees	523	Other state and local government enterprises
Club memberships	516	Social, civic, professional, and other similar organizations
Magazine subscriptions	154	Printing
Vehicle sales	396	Retail -- Motor Vehicles
Gasoline for OHVs and tow vehicles	402	Retail -- Gasoline Stations
Restaurant/lounge purchases	501	Food Services and Drinking Places
Food and Beverage Purchases at Grocery or Convenience stores	400	Retail Food and Beverage Stores
Guides and tour packages	496	Other amusement and recreation industries
User Fees and Donations	526	Other state and local government enterprises
Souvenirs, gifts, and entertainment	406	Retail -- Clothing and clothing accessories
Overnight Accommodations	499	Hotels and motels

3.2 Direct Expenditures in Colorado

Motorized recreation enthusiasts are resident and non-residents that contribute to Colorado's economy by purchasing commodities related to motorized recreation. These purchases include new vehicles, expenditures related to recreational trips (hotels, food, fuel, etc.), maintenance/operating costs for vehicles,

[15] All retail purchases are margined within IMPLAN® Pro. Margins represents the difference between producer and purchaser prices in a retail or wholesale environment, and IMPLAN® Pro provides an allocation of retail spending to the appropriate manufacturing, retail and wholesale trade sectors, and transportation industries. For example, for the new vehicle purchases, IMPLAN® Pro only applies the margined amount or the mark-up that the retail establishment receives when selling the vehicle and reduces portion of sales allocated to the manufacturing component. As a result, there is a considerable difference between the direct expenditures and the direct sales effect on Colorado. Although motorized enthusiasts spend $2.4 billion on various expenditures within the state, their contribution to direct sales is $914 million (see the following section).

and other accessories related to motorized recreation (clothes, tools, safety equipment, etc.). Results from this study indicate that motorized recreation enthusiasts contributed $914 million in direct sales (Table 3-2) related to this activity in Colorado during the 2014–2015 season. Motorized recreation supported approximately 11,000 direct jobs and $380 million in direct labor and proprietor income during the 2014–2015 season in Colorado. Additionally, these activities contributed $546 million in GRP, $70 million in state and local business taxes, and $88 million in federal taxes. These results are summarized in Table 3-2.

Table 3-2. Total Direct Economic Contributions of Off-Highway Vehicle Recreation in Colorado

Total Direct Gross Sales	**$913,900,608**
Gross Sales Components[1]	
Jobs	10,933
Labor Income	$379,351,682
Value Added or GRP	$546,001,560
State and Local Business Taxes	$70,316,126
Federal Business Taxes	$88,056,193

[1]Note: Figures for labor income, other property type income, and indirect business taxes are components of gross sales and thus cannot be added together. Adding all dollar figures in this table would constitute double counting of economic contribution.

3.3 Multiplier Effects in Colorado

The direct expenditures made by motorized recreation enthusiasts have additional economic effect by generating indirect and induced (downstream) activities, also known as economic multiplier effects. These multiplier effects are the result of downstream businesses benefitting from the purchases of the directly affected industry and workers spending their income in the regional economy. For example, when motorized recreation participants spend their income to purchase services from an automotive garage (direct effect), the garage would in turn purchase materials or equipment from distributers or manufacturers (indirectly affected businesses) and the workers of both the direct and indirectly affected business spend their salaries in the local economy. The multiplier effects of motorized recreation result in an additional $882 million in sales, 5,820 jobs, and $293 million in labor income during the 2014–2015 season (Table 3-3).

Table 3-3. Multiplier Economic Activity Associated with Off-Highway Vehicle Recreation

Indirect and Induced (Downstream) Contributions	$881,915,240
Gross Sales Components[1]	
Jobs	5,820
Labor Income	$292,509,619
Value Added or GRP	$494,373,079
State and Local Business Taxes	$36,274,473
Federal Business Taxes	$70,314,076

[1]Note: Figures for labor income, other property type income, and indirect business taxes are components of gross sales and thus cannot be added together. Adding all dollar figures in this table would constitute double counting of economic contribution.

3.4 Total Economic Contribution in Colorado

Motorized recreational enthusiasts supported $914 million in direct sales related to this activity during the 2014–2015 season. Theses direct sales also contributed to $882 million in indirect and induced sales for a total of $1.8 billion in total sales supported by motorized recreation in Colorado. Motorized recreation in Colorado is directly or indirectly responsible for almost 17,000 jobs and $671 million in labor income. The economic contribution in Table 3-4 is distributed by OHVs (ATVs, UTVs, and dual sport/dirt bikes), snowmobiles and 4WDs. Based on gross sales, OHVs contribute 72.8 percent of economic contribution while snowmobiles and 4WDs contribute 6.6 percent and 20.6 percent, respectively.

Table 3-4. Total Economic Contribution of Off-Highway Vehicle Recreation in Colorado for the 2014–2015 Season

Type of Impact	OHVs	Snowmobiles	4WDs	Total Economic Contribution
Total Gross Sales	$1,306,690,117	$118,517,904	$370,607,827	$1,795,815,847
Jobs	12,403	1,150	3,200	16,753
Labor Income	$489,783,466	$44,845,462	$137,232,373	$671,861,301
Value added or GRP	$753,200,500	$70,050,239	$217,123,900	$1,040,374,639
State and local business taxes	$76,484,748	$7,846,388	$22,860,939	$107,192,074
Federal business taxes	$114,827,234	$10,509,271	$32,590,274	$157,926,779

4. Regional Analysis of Off-Highway Vehicle Recreation in Colorado

This study also evaluated the regional economic contribution of motorized recreation within Colorado. The approach used the on-line survey to collect data on regions where enthusiasts participate in motorized recreation. The IMPLAN® Pro analysis used six regional study areas (Figure 4-1 and Table 4-1).

Figure 4-1. Regional Study Areas

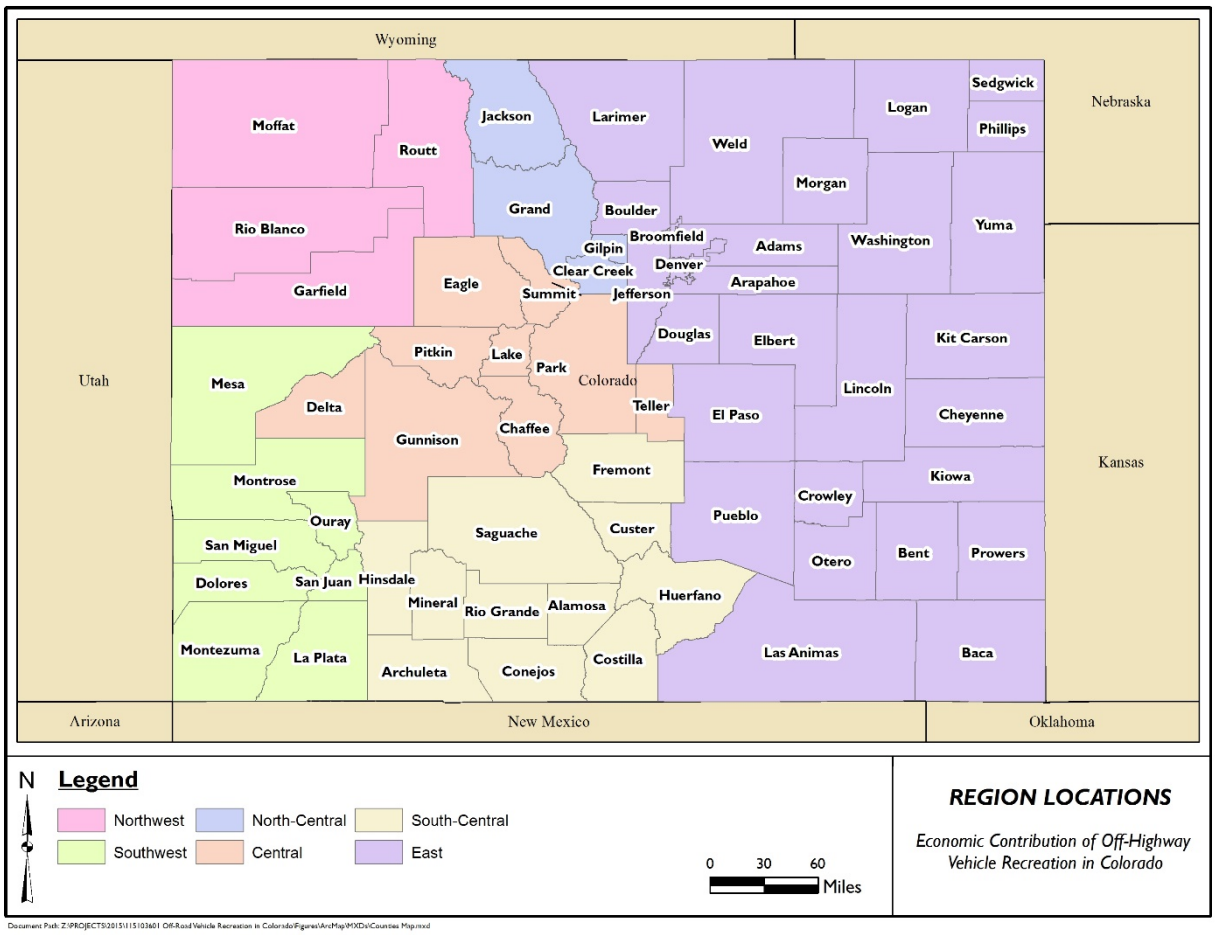


Table 4-1. Regional Study Areas

Region	Counties
Northwest	Garfield, Moffat, Rio Blanco, and Routt
Southwest	Mesa, Montezuma, Montrose, La Plata, Ouray, San Juan, Dolores and San Miguel
South-Central	Hinsdale, Saguache, Custer, Fremont, Huerfano, Costilla, Mineral, Alamosa, Conejos, Rio Grande, and Archuleta
Central	Eagle, Summit, Park, Gunnison, Lake, Pitkin, Chaffee, Delta, and Teller
North-Central	Gilpin, Clear Creek, Grand, and Jackson
Eastern Colorado	Adams, Arapahoe, Baca, Bent, Boulder, Broomfield, Cheyenne, Crowley, Denver, Douglas, El Paso, Elbert, Jefferson, Kiowa, Kit Carson, Larimer, Las Animas, Lincoln, Logan, Morgan, Otero, Phillips, Prowers, Pueblo, Sedgwick, Washington, Weld, and Yuma

The regional analysis focused on trip expenditures and did not include annual expenditures that are discussed under the state contribution analysis. Table 4-2 and Table 4-3 provide the percentages of trips by region for resident and non-resident participants obtained from the survey. The percentages were then applied to the total number of trips within the state (estimated from survey data) to estimate the trips to each region. The average trips for resident and non-resident households were then applied to average trip expenditures to the estimate the total expenditures per region. The IMPLAN® Pro study area models were then used to estimate the direct, indirect, and induced regional economic contribution.

Table 4-2. Trip Percentages by Region for Residents

Region	Snowmobiles	OHVs	4WDs
Northwest	18.6%	6.7%	4.2%
Southwest	11.9%	21.6%	23.2%
South-Central	11.2%	14.8%	5.9%
Central	38.8%	35.4%	33.8%
North-Central	18.0%	8.3%	3.9%
Eastern Colorado	1.5%	13.3%	19.0%

Table 4-3. Trip Percentages by Region for Non-Residents

Region	Snowmobiles	OHVs	4WDs
Northwest	8.9%	1.0%	1.6%
Southwest	26.7%	36.3%	52.7%
South-Central	44.4%	27.0%	14.5%
Central	15.6%	30.4%	26.3%
North-Central	4.4%	1.0%	1.6%
Eastern Colorado	0.0%	4.2%	3.2%

Regional Economic Contribution Results

The regional economic contribution of motorized recreation is summarized in Table 4-4, Table 4-5, and Table 4-6. The region that received the greatest economic contribution from motorized recreation during the 2014–2015 season was central Colorado, with motorized recreation supporting total sales of $339 million. The southwest and south-central regions in Colorado also attracted considerable motorized recreation, supporting $328 million and $199 million in total sales, respectively.

Table 4-4. Estimated Economic Contribution of Motorized Recreation by Region in Colorado for the 2014–2015: Summer and Winter

Contribution	Colorado Region					
Direct Impact	**Northwest**	**Southwest**	**South-Central**	**Central**	**North-Central**	**East**
Direct sales	30,113,330	195,862,049	135,597,560	224,084,189	42,137,159	64,352,673
Number of jobs	439	2,847	2,137	2,924	642	927
Labor income	13,274,499	75,803,896	47,647,425	100,643,174	17,851,384	27,915,078
Value added or GRP	17,379,344	105,791,224	68,179,839	134,788,833	23,923,204	36,964,599
State and local taxes	2,029,368	14,888,846	11,324,980	16,300,471	2,679,442	4,834,977
Federal taxes	3,016,869	17,515,374	10,681,328	25,452,716	4,358,547	6,173,680
Other Economic Activity						
Indirect and induced sales	16,489,399	132,749,460	63,556,089	115,573,008	14,515,449	64,019,011
Number of jobs	123	1,093	559	901	126	415
Labor income	4,876,121	39,127,143	15,795,195	33,711,279	3,580,615	21,403,039
Other property type income	9,010,545	66,433,848	28,583,240	63,808,816	7,161,286	36,329,594
State and local taxes	731,003	5,858,618	2,850,412	5,208,124	665,970	2,578,343
Federal taxes	1,350,697	9,394,935	3,548,226	9,672,040	513,547	5,055,088
Total Economic Activity						
Total sales	46,602,730	328,611,509	199,153,649	339,657,197	56,652,608	128,371,684
Number of jobs	563	3,940	2,696	3,825	768	1,342
Labor income	18,150,620	114,931,039	63,442,620	134,354,453	21,431,999	49,318,118
Other property type income	26,389,889	172,225,073	96,763,079	198,597,648	31,084,490	73,294,194
State and local taxes	2,854,494	20,676,912	14,457,611	21,954,832	3,402,398	7,355,963
Federal taxes	4,269,637	27,079,470	14,574,985	34,672,802	5,401,198	11,213,783

Pinyon

Table 4-5. Estimated Economic Contribution of Motorized Recreation by Region in Colorado for the 2014–2015: Winter

Contribution	Colorado Region					
Direct Impact	**Northwest**	**Southwest**	**South-Central**	**Central**	**North-Central**	**East**
Direct sales	5,959,276	8,942,582	13,149,504	11,716,376	4,758,151	313,018
Number of jobs	93	137	217	172	80	5
Labor income	2,673,162	3,510,778	4,568,653	5,577,184	2,072,562	148,371
Value added or GRP	3,531,185	5,043,730	6,857,492	7,265,601	2,746,931	184,416
State and local taxes	471,932	803,263	1,333,796	889,521	350,348	23,726
Federal taxes	608,978	833,704	1,074,699	1,241,167	510,677	29,270
Other Economic Activity						
Indirect and induced sales	3,117,283	5,760,299	5,849,744	5,807,080	1,583,464	308,350
Number of jobs	23	48	52	45	14	2
Labor income	909,775	1,679,897	1,450,576	1,664,957	383,426	101,490
Other property type income	1,718,433	2,909,081	2,673,336	3,272,889	792,564	176,055
State and local taxes	136,807	232,542	297,395	251,307	61,273	11,446
Federal taxes	221,045	409,040	305,486	405,587	52,093	25,037
Total Economic Activity						
Total sales	9,076,560	14,702,881	18,999,247	17,523,456	6,341,615	621,368
Number of jobs	116	185	269	217	94	7
Labor income	3,582,937	5,190,675	6,019,230	7,242,140	2,455,988	249,861
Other property type income	5,249,618	7,952,812	9,530,828	10,538,491	3,539,496	360,472
State and local taxes	643,866	1,048,203	1,654,890	1,155,293	418,582	37,735
Federal taxes	870,194	1,233,570	1,419,492	1,660,614	615,170	55,142

Table 4-6. Estimated Economic Contribution of Motorized Recreation by Region in Colorado for the 2014–2015: Summer

Contribution	Colorado Region					
Direct Impact	**Northwest**	**Southwest**	**South-Central**	**Central**	**North-Central**	**East**
Direct sales	24,154,0554	186,919,467	122,448,056	212,367,813	37,379,009	64,039,655
Number of jobs	346	2,710	1,921	2,752	562	922
Labor income	10,601,337	72,293,118	43,078,772	95,065,990	15,778,822	27,766,708
Value added or GRP	13,848,159	100,747,494	61,322,348	127,523,231	21,176,272	36,780,183
State and local taxes	1,557,436	14,085,583	9,991,184	15,410,950	2,329,094	4,811,251
Federal taxes	2,407,891	16,681,670	9,606,629	24,211,548	3,847,870	6,144,410
Other Economic Activity						
Indirect and induced sales	13,372,116	126,989,161	57,706,345	109,765,928	12,931,985	63,710,661
Number of jobs	100	1,045	507	856	112	413
Labor income	3,966,345	37,447,246	14,344,619	32,046,322	3,197,189	21,301,549
Other property type income	7,292,112	63,524,767	25,909,904	60,535,926	6,368,721	36,153,539
State and local taxes	594,196	5,626,076	2,553,018	4,956,817	604,697	2,566,897
Federal taxes	1,129,653	8,985,894	3,242,739	9,266,453	461,455	5,030,050
Total Economic Activity						
Total sales	37,526,170	313,908,628	180,154,401	322,133,741	50,310,993	127,750,316
Number of jobs	446	3,755	2,428	3,608	674	1,334
Labor income	14,567,682	109,740,364	57,423,390	127,112,313	18,976,011	49,068,257
Other property type income	21,140,270	164,272,261	87,232,252	188,059,158	27,544,994	72,933,722
State and local taxes	2,210,629	19,628,709	12,802,721	20,799,540	2,983,816	7,318,229
Federal taxes	3,399,443	25,845,900	13,155,493	33,012,188	4,786,027	11,158,641

5. Study Limitations

A conservative approach was taken in evaluating the economic contribution of motorized recreation. As such, certain activities and events have been excluded from the analysis because adequate data was not available to include these activities within the analysis. In addition, the preparers of this analysis utilized a number of assumptions within the analysis and additional information regarding these assumptions would help to improve the accuracy of the results. Additional data and information needs include the following.

- Data needed to estimate non-residential households that travel to Colorado to participate in motorized recreation is limited. While non-residents are required to obtain a use permit to use motorized vehicles on public lands in Colorado there is evidence that the rate of compliance is low. Thus, the number of non-residential households included in the study may be low.

- Both this study and previous studies have run into difficulties estimating the number of households that use 4-wheel drive vehicles specifically for motorized recreation. These types of vehicles are very popular in Colorado and only a percentage of these households use these vehicles for off-road recreational purposes. There are limited data sources to accurately estimate this percentage.

- There are a number of organized motorized recreational events and rallies that have economic impacts important to local communities and the state. The full of extent of these activities and events has not been inventoried or evaluated.

- Commercial guides and rentals have not been estimated for this study. These operations are popular in many parts of the state and add to the economic contribution of motorized recreation.

Appendix A: Summary Data

Number of Households Participating in Motorized Recreation

The tables in this appendix summarize the estimated percentage of households that participated in motorized recreation as well as the average number of trips during the 2014–2015 season. Table A-1 summarizes the percentages of respondents that participated in motorized recreation during the 2014–2015 season, based on data collected from surveys.

Table A-1. Percentage of Respondents that Participated in Motorized Recreation during 2014–2015 Season

Residence	OHVs	Snowmobiles	4WDs
Colorado Resident Households	98%	94%	98%
Non-Resident Households	81%	85%	74%

Table A-2 provides the total number of households that participated in motorized recreation during the 2014–2015 season.

Table A-2. Number of Households Participating in Motorized Recreation during the 2014–2015 Season

Residence	OHVs	Snowmobiles	4WDs	Total
Colorado Resident Households	104,916	12,934	51,332	169,181
Non-Residents Households	22,604	4,043	3,500	30,329

Table A-3 displays the average number of trips taken by residents and non-resident households in Colorado during the 2014–2015 season based on the 2015 survey responses.

Table A-3. Average Number of Trips Taken during 2014–2015 Season

Residence	OHVs	Snowmobiles	4WDs
Colorado Resident Households	17	15	15
Non-Resident Households	9	12	7

Itemized Trip Expenditures for Trips Associated with Motorized Recreation in Colorado during 2014–2015 Season

The following tables summarize the average trip expenditures used to estimate total trip expenditures by motorized recreational enthusiasts during the 2014–2015 season. The itemized expenditures are specified for both resident and non-resident households (Table A-4 and Table A-5). Adjustments were made to these expenditures to eliminate outliers and unrelated items based on survey responses.

Table A-4. Average Itemized Expenditures for Latest Trip for Residential Households

Expenditure Category	OHVs	Snowmobiles	4WDs
Gasoline/Oil for Motorized Recreational Vehicles	$59.72	$82.39	$119.02
Gasoline/Oil for tow vehicles	$102.99	$98.77	$29.32
Restaurant/lounge purchases	$70.30	$82.00	$47.70
Food and Beverage purchased at grocery, convenience stores	$80.91	$51.66	$39.83
Overnight accommodations (motel, cabin, etc.)	$80.30	$92.06	$61.80
Guides and tour packages	$2.71	$2.77	$1.67
User Fees and donations	$22.50	$4.61	$7.46
Souvenirs, gifts and entertainment	$13.09	$15.23	$16.15
Other trip related expenses	$13.16	$8.67	$10.71
Total	**$445.68**	**$438.16**	**$333.66**

Table A-5. Average Itemized Expenditures for Latest Trip for Non-Resident Households

Expenditure Category	OHVs	Snowmobiles	4WDs
Gasoline/Oil for Motorized Recreational Vehicles	$143.36	$145.91	$121.13
Gasoline/Oil for tow vehicles	$393.80	$134.77	$60.38
Restaurant/lounge purchases	$426.39	$137.73	$92.08
Food and Beverage purchased at grocery, convenience stores	$299.22	$96.36	$67.17
Overnight accommodations (motel, cabin, etc.)	$638.10	$233.23	$219.91
Guides and tour packages	$49.35	$50.00	$1.70
User Fees and donations	$170.80	$16.14	$8.68
Souvenirs, gifts and entertainment	$124.88	$43.86	$45.09
Other trip related expenses	$104.83	$50.00	$14.15
Total	**$2,351.71**	**$908.00**	**$630.28**

Adjustments were made to latest trip expenditures for residents in order to estimate day and overnight expenditures. (Table A-6 and Table A-7) The latest trip expenditures for OHVs and snowmobiles were divided by the average number of days respondents indicated that they participated in motorized recreation during their latest trip. It was assumed that 4WD day and overnight trip expenditures would remain the same, excluding overnight accommodations for the latest day trip. Latest day trip for non-residents was not included in the analysis as it was assumed all trips would be overnights trips.

Table A-6. Average Itemized Expenditures for Latest Day Trip for Residential Households

Expenditure Category	OHVs	Snowmobiles	4WDs
Gasoline/Oil for Motorized Recreational Vehicles	$41.66	$52.76	$119.02
Gasoline/Oil for tow vehicles	$71.85	$63.25	$29.32
Restaurant/lounge purchases	$49.04	$52.51	$47.70
Food and Beverage purchased at grocery, convenience stores	$56.45	$33.08	$39.83
Overnight accommodations (motel, cabin, etc.)	NA	NA	NA
Guides and tour packages	$1.89	$1.77	$1.67
User Fees and donations	$15.70	$2.96	$7.46
Souvenirs, gifts and entertainment	$9.13	$9.75	$16.15
Other trip related expenses	$9.18	$5.55	$10.71
Total	**$245.89**	**$221.63**	**$271.85**

Table A-7. Average Itemized Expenditures for Latest Overnight Trip for Resident Households

Expenditure Category	OHVs	Snowmobiles	4WDs
Gasoline/Oil for Motorized Recreational Vehicles	$59.72	$82.39	$119.02
Gasoline/Oil for tow vehicles	$102.99	$98.77	$29.32
Restaurant/lounge purchases	$70.30	$82.00	$47.70
Food and Beverage purchased at grocery, convenience stores	$80.91	$51.66	$39.83
Overnight accommodations (motel, cabin, etc.)	$80.30	$92.06	$61.80
Guides and tour packages	$2.71	$2.77	$1.67
User Fees and donations	$22.50	$4.61	$7.46
Souvenirs, gifts and entertainment	$13.09	$15.23	$16.15
Other trip related expenses	$13.16	$8.67	$10.71
Total	**$445.67**	**$438.18**	**$333.65**

Annual Expenditures on Maintenance, Storage, and Miscellaneous Items Associated with Motorized Recreation in Colorado

The annual expenditures by resident and non-resident households for vehicle maintenance, repairs, storage, and miscellaneous items during the 2014–2015 season were obtained from the survey results. Table A-8 and Table A-9 summarize the average itemized annual expenditures for resident and non-resident households in Colorado.

Table A-8. Average Estimated Itemized Expenditures by Resident Households in Colorado, 2015

Expenditure Category	OHVs	Snowmobiles	4WDs	Average All Vehicles
Repairs and Parts	$1,021	$1,147	$1,953	$1,374
Vehicle Storage	$92	$104	$88	$95
Motorized Recreational Accessories (covers, saddle or tank bags, ski skins, studs, carbides, mirrors, etc.)	$533	$490	$1,282	$768
Clothing (suits, pants, gloves, etc.)	$370	$33	$2	$135
Safety Equipment (helmets, tools, first aid, etc.)	$321	$402	$342	$355
Annual Insurance Payment	$220	$218	$546	$328
Registration or Permit Fee	$102	$70	$140	$104
Club Memberships	$52	$43	$36	$44
Magazine Subscriptions	$15	$11	$12	$13
GPS, Maps, Software	$0.84	$102	$6	$36
Other Items	$47	$36	$180	$88
Total	**$2,779**	**$2,660**	**$4,592**	**$3,344**

Table A-9. Average Itemized Expenditures by Non-Resident Households in Colorado, 2015

Expenditure Category	OHVs	Snowmobiles	4WDs	Total All Vehicles
Repairs and Parts	$864	$795	$1,568	$1,076
Vehicle Storage	$40	$209	$77	$109
Motorized Recreational Accessories (covers, saddle or tank bags, ski skins, studs, carbides, mirrors, etc.)	$593	$337	$1,307	$745
Clothing (suits, pants, gloves, etc.)	$448	$61	$0.00	$170
Safety Equipment (helmets, tools, first aid, etc.)	$409	$339	$193	$314
Annual Insurance Payment	$287	$370	$521	$393
Registration or Permit Fee	$155	$99	$143	$132
Club Memberships	$92	$69	$35	$65
Magazine Subscriptions	$21	$9	$20	$17
GPS, Maps, Software	$3	$69	$9	$27
Other Items	$137	$93	$336	$188
Total	**$3,055**	**$2,453**	**$4,213**	**$3,240**

New Vehicle Sales

Pinyon used information from a number of sources to estimate the sales of vehicles used for motorized recreation in Colorado during the 2014–2015 season (Table A-10). Data was obtained from the Motorcycle Industry Council on the number of dirt bikes and ATVs purchased in 2015. The retail sales of these vehicles were obtained by contacting dealerships and internet sources. The number of snowmobiles sold in Colorado and the average retail prices were obtained from the International Snowmobile Manufacturers' Association for the 2014–2015 season. The number of UTVs sold and average retail prices were obtained from Colorado dealerships and internet sources.

In the 2001 study, 11 percent of households using 4WDs for motorized recreation purchased new 4WDs on an annual basis. For this analysis, Pinyon used a more conservative estimate of one percent of households would purchase a new vehicle for motorized recreation based on current survey data and assumptions. The value of new sales for all vehicles ranged from $15.9 million for 4WDs to $43.2 million for ATVs. Total vehicle sales are estimated to be $163 million.

Table A-10. Estimated OHV Sales by Residential Households in 2014-2015 Season

	ATVs	Dirt or Dual Purpose Bikes	UTVs	Snowmobiles	4WDs	Total All Vehicles
Number of new vehicles sold	5,140	4,440	3,300	2,216	496	10,492
Average price of new vehicles purchased	$8,412	$7,276	$15,000	$10,000	$32,217	NA
Estimated Value of New Vehicles Sales in Colorado	**$43,237,680**	**$32,305,440**	**49,500,000**	**$22,160,000**	**$15,979,632**	**$163,182,752**

Appendix B: Literature Review

The following studies were reviewed as part of the current evaluation of motorized recreation in Colorado.

Burton C. English, Jamey Menard and Kim Jensen. 2008. Argi-Industry Modeling and Analysis Group: Estimated Economic Impacts of Upper Tellico Off-Highway Vehicle Users and Tellico River Trout Anglers.

> This study estimated local economic impacts from expenditures by OHV trail users in North Carolina's Upper Tellico area and trout anglers along the Tellico River using surveys and input-output modeling (IMPLAN). The analysis estimated that 12,000 OHV and 7,900 trout anglers use the Tellico area. Based on the results from IMPLAN the total economic impact in sales by OHV users was $4.8 million and $1.1 million by trout anglers.

Burton C. English, Jamey Menard and Kim Jensen. 1998. Argi-Industry Modeling and Analysis Group: Estimated Statewide Economic Impacts of Off-Highway Vehicles.

> Tennessee's statewide economic impact analysis of the OHV industry was conducted using survey data and input-output modeling (IMPLAN). Findings estimate that 156,000 Tennessee households participate in OHV recreation. Total statewide economic impacts from OHV activities were estimated to be $3.43 billion in sales and 52,300 jobs.

Colorado Parks and Wildlife (CPW). 2014. Colorado Statewide Comprehensive Outdoor Recreation Plan: Strategies for Sustaining Colorado's Outdoor Heritage.

> The Colorado Statewide Comprehensive Outdoor Recreation Plan (SCORP) outlines a 5-year plan to sustain and improve Colorado's outdoor recreation resources. Strains from population growth and recent natural disasters have challenged the provision of social, physical, and economic benefits of Colorado's natural resources, including outdoor recreation.
>
> Through public surveys conducted by SCORP, this study attempted to discover the demand for and supply of outdoor recreation resources to determine the associated economic impacts. This plan will guide the state and decision-making in recreation management and policy for the next 5 years. The report cites the 2014 analysis by Southwick Associates "The Economic Contributions of Outdoor Recreation in Colorado: A Regional and County-level Analysis." The analysis was conducted using a CPW survey sent to 7,000 residents based on a set of 38 activities associated with outdoor recreation developed by the CORP. Some of the analysis was based on previous work performed by the Outdoor Industry Association. IMPLAN was used to estimate economic impacts. Total economic impacts resulted in $34.5 billion in sales and 313,000 jobs in Colorado.

Daniel Otto and Harveyor Siegelman. 2008. The Economic Impact of Off-Highway Vehicles in Iowa.

> This 2007 study consisted of two parts: the first was a random survey of OHV owners in Iowa to estimate usage and expenditures. Second, the information collected was analyzed using an input-output model (IMPLAN) to estimate impacts to income and employment of OHV users. Total statewide OHV recreation impacts were estimated to be $126 million in sales and 1,200 jobs. The results were combined with national and regional information to assess the economic potential of creating new OHV multi-use trails in Iowa.

Ernesto C. Venegas. 2009. Economic Impact of Recreational Trail Use in Different Regions of Minnesota.

The Minnesota Recreational Trail Users Association conducted a survey of its members to better understand expenditures and economic impacts on surrounding areas. IMPLAN was used to estimate the economic impacts of 10 different trail-use recreational activities in 5 Minnesota regions.

Gregory Parent, Janaki Alavalapati, Taylor Stein and Alan Hodges. (2007). Economic Impacts and Motivations of Off-Highway Vehicle Recreationists: A Case Study from Florida.

This study was conducted using a mailed survey and describes OHV participants' socio-demographics, motivations, travel and equipment expenditures. Total economic impact was established through an input-output (IMPLAN) analysis. A total economic impact was $4.3 million in sales and 318 jobs.

Governor's Off-Highway (OHV) Vehicle Study Committee. 1999. Governor's Off-Highway Vehicle Study (Tennessee).

Tennessee Governor Don Sundquist selected the Study Committee of Off-highway Vehicles to assess economic, social, and environmental issues related to OHV recreation. From 1995 to 2000, OHV recreation in Tennessee steadily increased and is estimated to continue to grow. Unlike some states, during the analysis Tennessee did not require out-of-state OHV users to purchase registrations and therefore had no means of estimating non-resident OHV users or remediating costs associated with out-of-state users. The goal of the committee was to better determine how to regulate Tennessee's OHV use to protect public safety, local property owners, and natural resources.

Mark J. Okrant and Laurence E. Goss. 2004. The Impact of Spending by ATV/Trailbike Travel Parties on New Hamspire's Economy During July 2002 to June 2003.

A survey by the Institute for New Hampshire Studies (INHS) of ATV and trailbike owners was used to estimate the average household ownership of ATVs and trailbikes. An analysis of multiplier effects on economic impacts was also conducted using IMPLAN. The study concluded that New Hampshire residents are responsible for 82 percent of total spending from ATV/trail biking travel parties. Total economic impact to New Hampshire's economy was approximately $318 million in sales and 3,379 jobs. The authors suggest that the attraction of more out-of-state ATV and trail biking parties to New Hampshire would result in increased economic impacts.

Outdoor Industry Association (2012): The Outdoor Recreation Economy.

This report focused on the direct economic impact of outdoor recreation of ten activities: bicycling, camping, fishing, hunting, motorcycling, off-roading, snow sports, trail sports, water sports and wildlife viewing. The report was developed using online surveys conducted by Harris interactive and IMPLAN economic models to estimate income, jobs, and tax revenue impacts to regional and national economies. Communities across the country are beginning to realize that outdoor recreation is an expanding and diverse economic sector.

According to this report annual consumer spending on outdoor recreation was approximately $646 billion, just less than financial services and insurance at $780 billion. Additionally, consumer spending supported 6.1 million direct jobs and $80 billion in federal, state, and local tax revenue. The Outdoor Industry Association estimated that the outdoor recreation economy has grown 5 percent annually between 2005 and 2011 even during the economic recession. The outdoor recreation economy has the potential to continue to grow, create jobs and produce economic gains if managed properly.

Western Agricultural Economics Association. Western Economic Forum, Volume 7, Number 2: Thomas Foulke, Christopher T. Bastian, David T. Taylor, Roger H. Coupal, and Desiree Olson. 2008. Off-Road Vehicle Recreation in the West: Implications of a Wyoming Analysis.

> This paper examined the economic impacts of non-resident expenditure patterns of off-road vehicles in Wyoming through means of a broad-based survey. The authors conclude that off-road vehicles are multiple-use vehicles used in a wide spectrum of recreational activities ranging from camping, hunting, fishing, and many others. Using input-output modeling (IMPLAN), total economic impact of non-resident users for 2005 supported $8.4 million in sales, 127 jobs, and $3.3 million in labor income.