

The Economic Impacts of Off-Highway Vehicle (OHV) Recreation in Oregon

Main Report

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Executive Summary

Despite a recent decline, during the past decade there has been a dramatic increase in sales and permit registrations for off-highway vehicles (OHVs) in Oregon. These vehicles include quads and three-wheel ATVs (Class I), dune buggies, sand rails, and 4x4 vehicles (Class II), and off-highway motorcycles (Class III). This report updates the 1999 OHV economic impact analysis, based on expenditure reported by a sample of OHV riders for the year 2008.

As with any economic activity, this expenditure creates multiplier effects in the economy. The **economic significance of equipment expenditure** reflects all activity, by region, from “one-off” purchases such as OHV vehicles, trailers, and tow vehicles. The **economic impact of trip expenditure** reflects “new money,” by region, from fuel, lodging, food, and other spending related to the use of OHVs. All spending reflects recreational OHV use of public lands in Oregon. Equipment expenditure is from Oregon residents, while trip expenditure is in-Oregon spending by Oregon residents and out-of-state visitors.

Within Oregon, an estimated 68,202 households engage in recreational OHV riding. These households spent an estimated \$291 million on OHV equipment in 2008, with the Willamette Valley region representing 38% of all equipment expenditure. Statewide, the average household spent \$4,259 on equipment, of which \$1,596 was for OHV vehicles and \$1,105 was the cost of vehicles attributable to towing OHVs. Statewide, this spending generated \$53.5 million in labor income, including employee compensation and proprietary income. This income supported 1,162 jobs.

An estimated 2.6 million household trip days were taken statewide in 2008, with the South Coast having the largest share (756,581 trip days). These trip days include all OHV riding, from an hour-long ride on adjacent land to a week-long vacation hundreds of miles away. Combined, local, non-local, and out-of-state trips were associated with \$250 million in trip expenditure in Oregon. A substantial portion of this total was for gasoline, to be expected given the record high gas prices that year. Statewide, this spending generated \$64.1 million in labor income, and this income supported 2,369 jobs.

Both types of expenditure involve significant retail components, but this is especially true for equipment. Much of this spending is quickly “lost” from the host region to purchase the products sold (vehicles, gasoline, etc.). In addition, jobs are both full-time and part-time, and with varying wage levels. This accounts for the difference between equipment and trip results with respect to the ratios between expenditure, income, and employment.

1. Introduction

In 1999, Oregon State University (OSU) conducted a study of off-highway vehicle (OHV) households in Oregon and estimated that \$74 million was spent on OHV equipment and related expenses (e.g., insurance and maintenance), and \$46 million was spent on OHV trips that year. OSU was contracted to conduct a similar evaluation for 2008, and results are presented in this report. Note that all estimates in this report are for recreational riding on public land in Oregon in 2008. It does not include expenditure associated with riding on land owned or leased by the operator of the vehicle, nor with riding for farming, agricultural, forestry operations, or nursery or tree growing operations.

This report is complemented by the Rider Demographics and Preferences Report, which presents information on OHV rider gender, age, types of areas commonly used for OHV recreation, and the distribution of OHV owners across counties/regions and vehicle class. Expenditure data were gathered through surveys conducted by the OSU Survey Research Center as part of the state's OHV fuel tax analysis. The sampling and survey administration information below is adapted from the fuel tax report.

This update to the 1999 report is important because recreation trends change over time, and that is especially true for OHV recreation in Oregon. Two measures of OHV recreation trends are presented here. Figure 1.1 shows annual retail sales for ATVs (quads) and the two types of motorcycles (dirt bikes and dual sport) that are used off-highway.

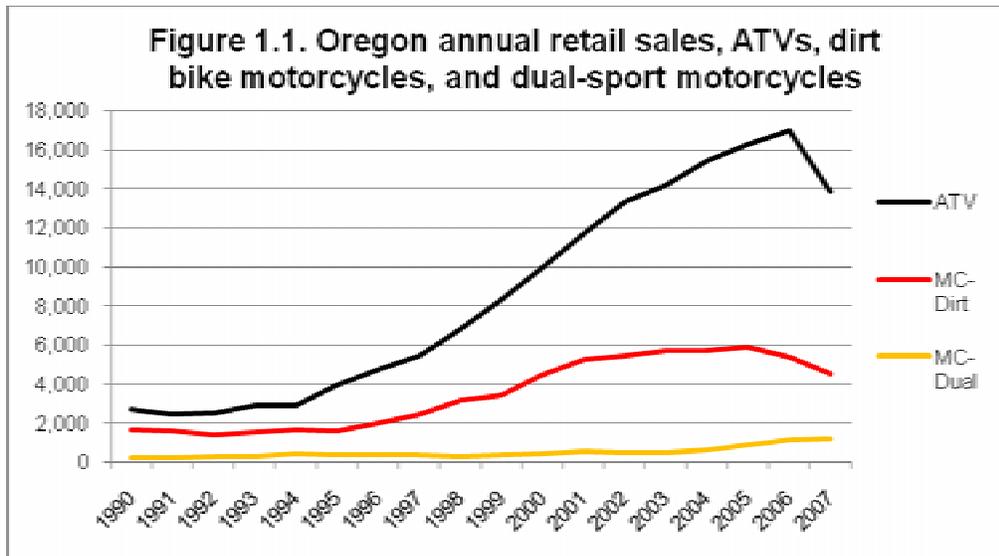
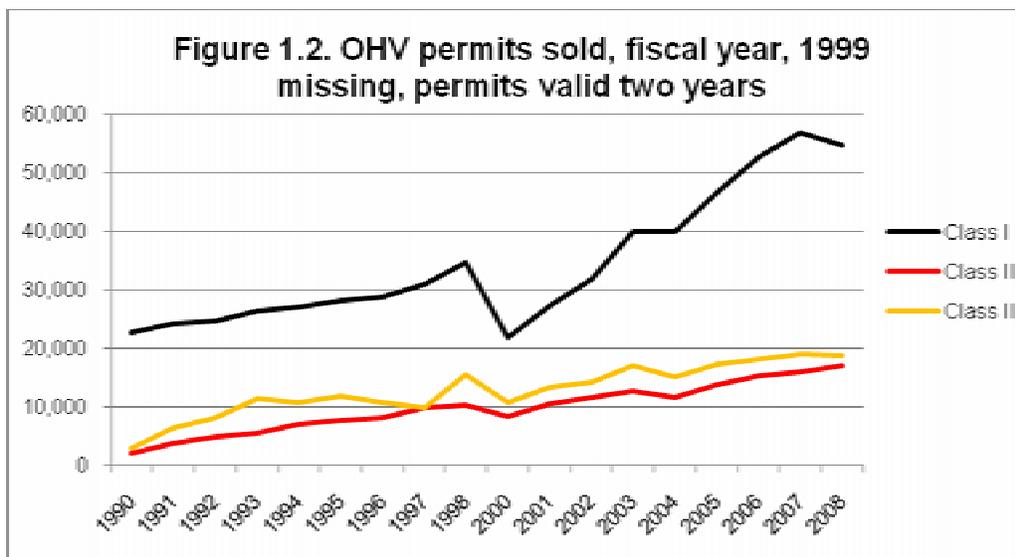


Figure 1.2 shows OHV permits sold by class and year in Oregon. Note that permits are valid for two years, so annual sales are less than Table 2.1 figures for current permits. Class I includes quads and three-wheel ATVs. Class II includes dune buggies, sand rails, and 4x4 vehicles. Class III includes off-highway motorcycles. Snowmobiles are not included in these figures or the analysis presented in this report.



There have been recent declines in Class I and Class III sales and permits. Nonetheless, the overall trend during this period has been substantial growth. This is especially true for Class I, but also true for Class II and Class III. The current analysis indicates that there are more than twice as many Oregon recreational OHV owning households in 2008 (68,202) than there were in 1999 (28,635).

In this report, “origin” or “from” refers to the region where the respondent lives. “Destination” or “to” refers to the region where the respondent engages in OHV riding. Where these regions are the same, the respondent is considered a local resident. For example, a trip made by a Willamette Valley resident to an OHV riding area in the Willamette Valley would be a “local resident trip.” If the same person took a trip to the South Coast, it would be in-state, but non-local. If a resident of Vancouver, Washington took a trip to an OHV riding area in the Willamette Valley, it would be out-of-state.

2. Sampling and Survey Administration

The survey was sent to a sample of persons holding Oregon OHV permits. Table 2.1 shows the population of all Oregon OHV permits by vehicle class and owner residence. Table 2.1 does not include an additional 21 records that could not be categorized due to missing information on state and/or vehicle class.

	In-state	Out-of-state	Total
Class I	84,832	18,010	102,842
Class II	24,988	5,264	30,252
Class III	28,985	5,205	34,190
Total	138,805	28,479	167,284

Three versions of the survey were used in the study, with each of these having in-state and out-of-state formats. Version 1 and 2 included questions relating to this analysis and are presented in Appendix B. The expenditure questions in these versions were the same for both the in-state and out-of-state formats.

The survey was administered by mail. A pre-notification letter was sent to sampled permit holders in January, 2009. This letter was followed by the first survey mailing, reminder/thank you postcards, and a follow-up survey mailing. March 31 was the cutoff for returned surveys to be included in this analysis.

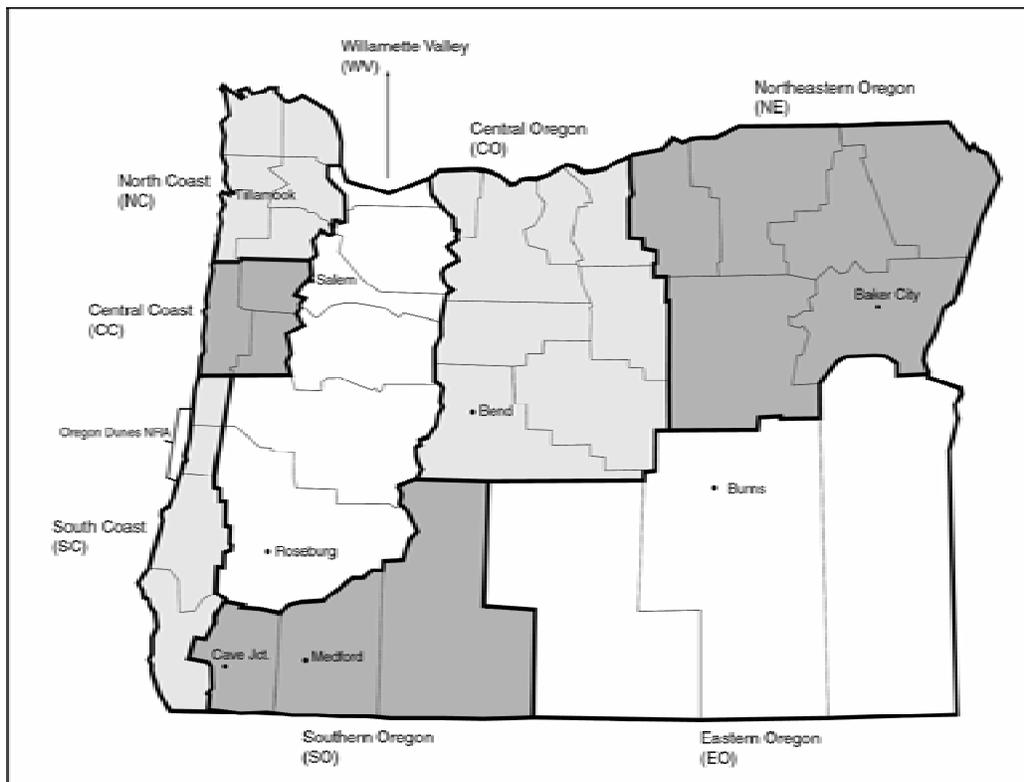
Table 2.2 shows sample size and response rates, adjusted for undeliverables and other factors. Note that some respondents did not use their OHVs on public land in Oregon in the past 12 months (Question 8a response 1). These respondents did not complete the expenditure questions. The number of completes involving respondents using their OHV on public land in Oregon is shown in parentheses in Table 2.2. These are the effective sample sizes for this analysis.

Table 2.2. Sample and response rates			
	Mail-out	Completes	Response rate (%)
Version 1, In-state	2029	701 (592)	39
Version 1, Out-of-state	396	97 (72)	28
Version 2, In-state	2028	688 (581)	38
Version 2, Out-of-state	397	110 (83)	31

OHV expenditures were reported in the survey at the household, not individual, level. As a result, the **population** of interest is all households who participated in recreational OHV riding on public lands in Oregon in 2008. All OHVs used on public lands in Oregon are required to have a permit, with permits administered by the Oregon Parks and Recreation Department (Oregon State Parks). The list of OHV permits served as the **sampling frame**. Invalid and foreign addresses were removed, and separate (in-state and out-of-state) systematic **mail-out samples** were selected for each version. The returned surveys represent the **completes samples**.

3. Regions, Out-of-State Riders, and Extrapolation from Sample to Population

Much of the analysis in this report is conducted at the regional level, with regions shown in the following map.



Note that the coastal portions of Lane and Douglas counties are in the South Coast region. However, some of the data were available only at the county, rather than region, level. Data were handled as follows:

- Version 1 respondents were fully allocated to the South Coast region if 1) they self-reported their county of residence as Lane or Douglas and 2) the city of residence on their OHV permit matched any coastal community (e.g., Florence).
- Version 2 respondents self-reported both county and region, so no re-allocation was needed.

OHV permits are required when riding OHVs on public land in Oregon. However, Oregon has reciprocal agreements with many states, such that persons with off-road permits from those states do not need to have an Oregon permit to ride on public lands in Oregon.¹ As shown in Table 2.1, many out-of-state residents have Oregon permits, but an unknown proportion of out-of-state residents ride in Oregon with a home-state permit rather than an Oregon permit. As described below, estimates of equipment expenditure do not include out-of-state residents. Estimates of trip expenditure include out-of-state residents.

Data were collected on the “completes samples” of individuals, with each respondent reporting on household expenditure. The “per household per trip day” averages are extrapolated to the population of OHV households statewide and in each region.

The Rider Demographics and Preferences Report presents OHV ownership patterns across counties/regions and classes in Oregon. That data is based on permit records, which do not include county or region information. Zip codes were used to classify permits by county and region, and permits were removed if they had obvious errors, such as no zip code or a zip code that did not match the state. Removed permits represent less than 0.2% of all permits. Some zip codes span county boundaries, so this classification process is imperfect.

Coastal Lane and Douglas presented challenges in estimating the number of OHV households per region. In Lane and Douglas counties as a whole, there are 12,155 households with OHVs in the data file, yet no perfect method for allocating them between the South Coast and Willamette Valley regions. A partial re-allocation was conducted, with residents of Florence, Mapleton, Reedsport, and Winchester Bay allocated to the South Coast region. These four represent all coastal communities in Lane or Douglas county with at least 50 households having at least one OHV permit (all classes combined).

Many households own more than one registered OHV and thus appear more than once in the list of permits. Excel’s “remove duplicates” routine was used to convert “permits” to “households.” If more than one permit was registered to a given household, as indicated by a matching street address, city, and zip code, all but one of the permits was removed to create the household database. This process is imperfect, as the same address in reality may be presented as two separate addresses in the database (e.g., “10 Main St.” and “10 Main Street” are counted as two separate households). Note that the “remove duplicates” process was applied to all classes combined, so results differ from the “per class” removal in the Rider Demographics and Preferences Report.

As shown in Table 2.2, not all OHV owners fit the population of participating in recreational riding on public lands in Oregon in 2008. For in-state respondents, the proportion is $(592+581) / (701+688) = 84.4\%$. Estimates of total and recreational households are shown in Table 2.3, with recreational being 84.4% of each total.

¹ States with reciprocity are listed at <http://www.oregon.gov/OPRD/ATV/reciprocity.shtml>

	Total	Recreational
Statewide	80,808	68,202
Willamette Valley	34,310	28,958
Central OR	8,057	6,800
Northeastern OR	4,721	3,985
Eastern OR	1,610	1,359
Southern OR	9,311	7,858
South Coast	5,448	4,598
Central Coast	3,227	2,724
North Coast	14,124	11,921

These recreational household estimates are used to calculate the expenditure figures in this report.

4. Equipment Expenditure and Significance

In this analysis, OHV expenditure is separated into two components: equipment and trip. *Equipment expenditure* includes vehicle purchase, trailer purchase, maintenance, upgrades, accessories and apparel, and other “one off” expenditures associated with simply owning an OHV. *Trip expenditure* includes fuel, lodging, food, and other expenditure made while using an OHV. Note that short trips near home are included in the trip category, and all fuel is included in this category.

Version 1 respondents reported equipment expenditure, as shown in Question 11 and Question 13 in Appendix B. They also indicated, in Question 12, the expenditure percentage that was attributable to recreational riding in Oregon. Blank responses for a given expenditure category were treated as \$0 spent in that category. Some respondents did not complete Question 12. Respondents with no expenditure in Question 11 were given the value 100% for Question 12. Respondents with some expenditure in Question 11, but no percentage in Question 12, were removed from the analysis (fewer than 3% of the cases fell into this category). After these transformations, responses to Question 12 (recreational percentage) and Question 7 (public lands percentage) were used to adjust expenditure to reflect amounts spent on recreational OHV riding on public lands in Oregon.

Question 13 measures expenditure on tow vehicles that is attributable to OHV riding. Amounts were included if respondents:

- Purchased a vehicle (car, truck, etc.) during 2008 (Yes to Q13); and
- One of the reasons was to tow an OHV (Yes to Q13b); and
- If the respondent purchased the vehicle specifically for OHV towing (Response 1 to Q13c), the full purchase price was allocated to OHV riding;

- If the respondent would have bought a vehicle, regardless, but paid more for one that could be used for OHV towing (Response 3 to Q13c and Response 2 to Q13d), the additional amount was allocated to OHV riding.²

Note that several respondents reported large expenditure on OHV trailers (Question 11B). Amounts larger than \$20,000 were reviewed, and it appeared that these amounts reflected expenditure on RVs that have rear ATV compartments (often referred to as “toy haulers”). For example, some respondents reported the same amount for a trailer (Q11B) as for a tow vehicle (Q13). Therefore, all Q11B amounts \$20,000 or greater were transferred to the towing vehicle category.

Table 4.1 shows total 2008 equipment expenditure by region, while Table 4.2 shows the breakdown by expenditure category. Calculations are made at the regional level, then summed to the statewide level.

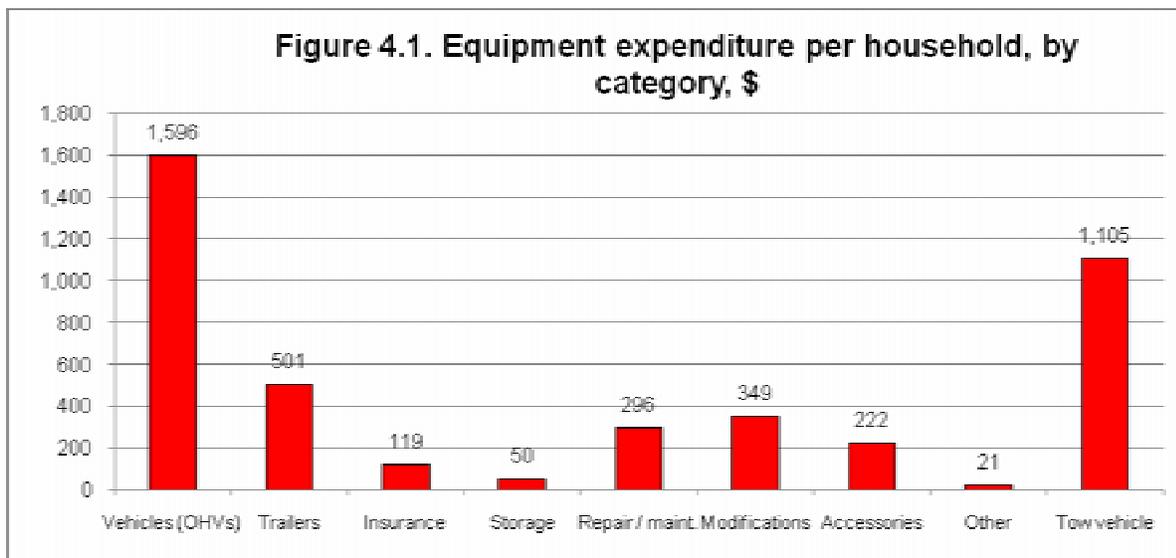
	Expenditure (\$ millions)	Percent of statewide
Statewide	290.5	100%
Willamette Valley	109.0	38%
Central OR	18.7	6%
Northeastern OR	11.5	4%
Eastern OR	3.7	1%
Southern OR	44.8	15%
South Coast	24.9	9%
Central Coast	31.5	11%
North Coast	46.3	16%

	Expenditure (\$ millions)	Percent of total
Total	290.5	100%
Vehicles (OHVs)	108.9	37%
Trailers	34.2	12%
Insurance	8.1	3%
Storage	3.4	1%
Repair / maint.	20.2	7%
Modifications	23.8	8%
Accessories	15.1	5%
Other	1.5	1%
Tow vehicle	75.4	26%

² The wording in Q13d Response 2 is “less,” but this refers to the alternate vehicle rather than the one bought for towing.

Table 4.3 shows equipment expenditure on a per household basis, while Figure 4.1 shows expenditure graphically. The percentages across categories remain the same as in Table 4.2.

Table 4.3. Equipment expenditure by category, per household, 2008	
	Expenditure (\$)
Total	4,259
Vehicles (OHVs)	1,596
Trailers	501
Insurance	119
Storage	50
Repair / maint.	296
Modifications	349
Accessories	222
Other	21
Tow vehicle	1,105



Equipment and trip expenditure were “run” through the IMPLAN input-output model to estimate “multiplier effects.” IMPLAN creates a model of the study area economy, and this model is used to assess how spending in one sector generates impacts in other sectors.

The initial expenditure represents the “direct effect” on output. In order to provide the goods and services purchased by OHV riders, local businesses buy inputs from other businesses, and they pay wages and profits to individuals/households. Input purchases generate “indirect effects,” while spending of wages and profits generates “induced effects.” Input purchases and individual spending that occur outside the project area represent “leakages” that limit multiplier effects.

For example, assume that an OHV rider takes a trip to the coast and eats lunch at Restaurant X in Florence. In order to provide the lunch, Restaurant X hires (and pays) employees and purchases food that is then prepared for customers. Food is an input purchased from another

business, and this process generates indirect effects. Wages paid to employees generate induced effects, because those employees spend a portion of their income in the local economy (perhaps by eating at Restaurant Y or shopping at Supermarket Z).

The IMPLAN models were estimated in disaggregated form with all 509 IMPLAN sectors, but results are grouped into broad categories based on the 2-digit NAICS classification.³ Appendix A provides details on analysis steps and on input-output analysis assumptions. Because IMPLAN models are based on counties, or groups of counties, it was not possible to allocate the coastal Lane and coastal Douglas portions of the economy to the South Coast; they remain in the “main” Lane and Douglas counties within the Willamette Valley. This will understate linkages within the South Coast region. However, impacts are primarily driven by expenditure, and expenditure is allocated to the South Coast for coastal Lane and Douglas, as described above.

Results are presented for the following economic variables:

- **Output** or sales.
- **Labor income**, which includes employee compensation (including wages, salaries, and benefits) and proprietary income (including self-employment income).
- **Employment**, which includes both full-time and part-time jobs (it is not full-time equivalents).

Analysts often differentiate between **economic impact** and **economic significance**. Economic impact often refers to “new money” coming into a region, and it excludes the effect of expenditure by local residents – unless that expenditure would be made elsewhere in the absence of the specific recreation opportunity. Consider the example of a Bend resident who rides at the South Millican Valley OHV Trail System. Both the rider’s home and the riding area are in Central Oregon. Assume the rider would travel to the Willamette Valley to ride if the South Millican Valley system did not exist. In this case, “import substitution” occurs, and expenditure associated with South Millican Valley riding trips would be included as economic impact. Economic significance is a broader concept and includes expenditure by local residents regardless of their assumed behavior in the absence of the recreation opportunity being evaluated.

In the case of equipment expenditure, it is assumed that all expenditure occurred in the respondent’s region of residence. In practice, there will be some “cross-hauling” between regions and states. For example, some residents of Portland will make purchases in Washington, while some residents of Vancouver will make purchases in Oregon. It is assumed that these amounts balance each other out, so equipment expenditure by out-of-state residents was not included in the analysis.

Because respondents were not asked how their expenditure patterns would have changed in the absence of local opportunities to purchase OHV equipment, all multiplier effects associated with trip expenditure are treated as economic significance. An unknown, but probably substantial, proportion of these amounts likely represents economic impact insofar as many riders would travel elsewhere to buy equipment if needed.

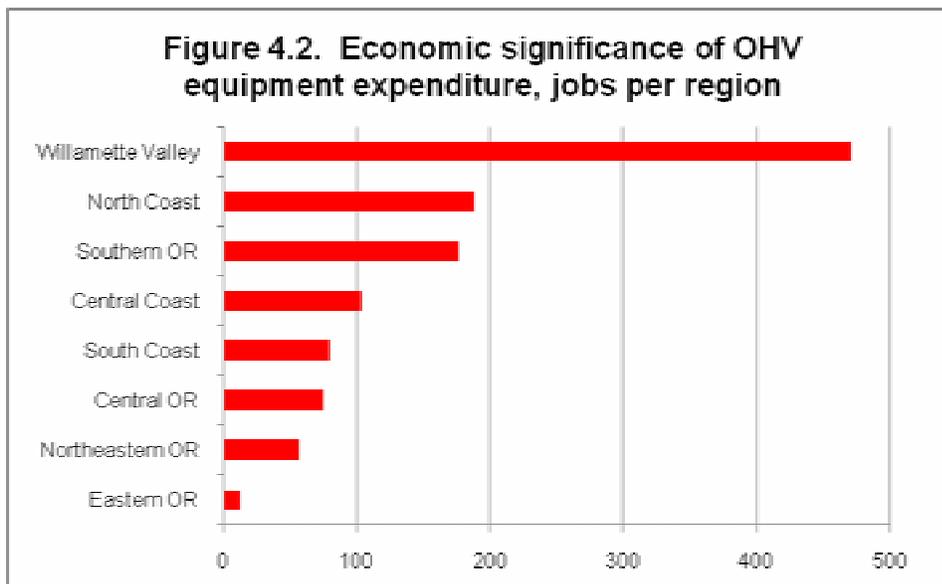
The economic significance of OHV equipment expenditure is presented in Table 4.4. Note that the first row presents the sum across the regions, rather than the statewide total. Because

³ See <http://www.naics.com/naics2-6page.htm> for category descriptions. NAICS is the North American Industry Classification System, a system for classifying economic activity into categories.

linkages are greater at the level of a statewide economy than at the level of a regionwide economy, statewide expenditure would generate a somewhat greater estimate than the sum across regions shown here.

Table 4.4. Economic significance of 2008 equipment expenditure, output and labor income in millions of dollars			
	Output	Labor Income	Jobs
Sum across regions	285.3	53.5	1,162
Willamette Valley	112.1	22.8	471
Central OR	17.6	3.3	75
Northeastern OR	11.5	2.3	57
Eastern OR	3.4	0.5	12
Southern OR	44.5	7.5	177
South Coast	22.5	3.4	79
Central Coast	31.2	4.3	104
North Coast	42.6	9.5	188

Using the jobs figures, the distribution across regions is shown in Figure 4.2, sorted from highest to lowest.



5. Trip Expenditure and Impact

Respondents who completed Version 2 of the survey reported the number of trips and days made in each region and the amount spent on their most recent trip. These responses were used to estimate trip expenditure by region. Blank cells were treated as no trips / no expenditure in the relevant category.⁴

⁴ Except if a number was entered for trips, but not days. In that case, days is treated as a missing value rather than 0.

Trips are calculated at the residence region first, then summed to statewide totals. For example, trips to the South Coast are computed for riders living in the North Coast, Central Coast, and all other regions, including in the South Coast itself.

Table 5.1 shows average number of trips by origin (region of residence) and destination (region of OHV riding) in 2008. The diagonal is shown in bold and represents trips within one's home region. Abbreviations are used in the To row, with ordering following the From column. For example, looking across the first row, the average OHV household in the North Coast region made 7.9 trips within the North Coast region, 0.5 trips to the Central Coast region, and 1.2 trips to the South Coast region.

Looking down the first column, the North Coast region "received" 7.9 trips from the average OHV household living in that region, 1.1 trips from the average household living in the Central Coast region, and 0.1 trips from the average household living in the South Coast region.

Table 5.1. Trip origin and destination, by region, average number of in-state trips in 2008

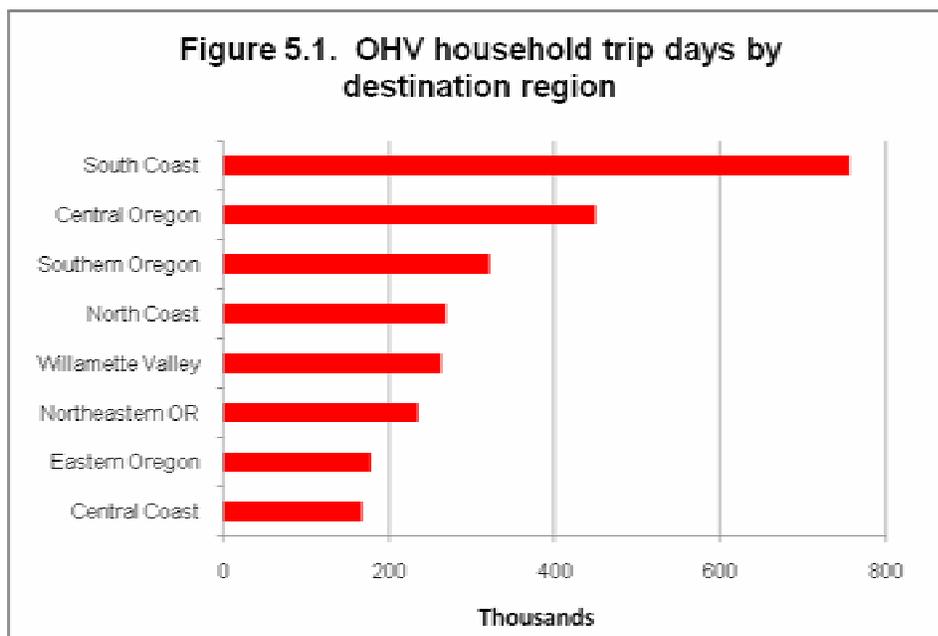
From \ To	NC	CC	SC	WV	CO	SO	NO	EO
North Coast	7.9	0.5	1.2	0.5	<u>1.9</u>	0.1	0.3	0.4
Central Coast	1.1	3.3	<u>5.5</u>	<u>13.9</u>	0.8	<u>0.8</u>	0.1	0.4
South Coast	0.1	<u>5.7</u>	20.9	0.4	0.3	0.1	0.1	0.4
Willamette Valley	<u>1.6</u>	1.0	<u>3.0</u>	4.9	1.6	0.5	0.3	0.2
Central Oregon	0.2	<u>2.0</u>	0.5	0.5	15.3	0.3	0.5	1.7
Southern Oregon	0.1	0.7	<u>2.3</u>	0.5	0.4	15.5	0.1	1.9
Northeastern OR	0.0	0.1	0.2	0.0	0.6	0.0	19.5	<u>2.3</u>
Eastern Oregon	0.0	0.1	0.0	0.0	0.1	0.0	<u>4.5</u>	7.9

Numbers in red and underlined show the primary destination region for each origin region, other than the origin region itself. Numbers with yellow shading show the destination region's main "source market" (origin region), other than the destination region itself. For example, on average, Central Coast residents take more trips to the Willamette Valley (13.9) than to any other region. The North Coast receives more trips on average from the Willamette Valley (1.6) than from other region. Northeastern Oregon and Eastern Oregon serve as each other's main origin and destination.

Table 5.2 shows average number of trips, days, and days per trip for each destination region. Table 5.2 also shows total number of trip-days by in-state and out-of-state rider origin. Figure 5.1 shows this graphically (sorted from highest to lowest total trip days).

Across all OHV households in Oregon, the average number of trips to the North Coast region was 1.8. On average, 2.8 days were spent in the North Coast across these 1.8 trips. This results in 1.5 days per trip.

Table 5.2. Trip patterns by destination region						
	Average across all in-state OHV households			OHV household trip days in region		
	Trips	Days	Days / Trip	In-state	Out-of-state	Total
North Coast	1.8	2.8	1.5	229,373	40,478	269,851
Central Coast	1.3	2.1	1.6	141,786	25,021	166,807
South Coast	3.5	7.1	2.0	499,343	257,237	756,581
Willamette Valley	3.1	3.4	1.1	223,618	39,462	263,080
Central Oregon	2.7	5.6	2.1	382,218	67,450	449,668
Southern Oregon	2.2	3.9	1.8	272,779	48,138	320,917
Northeastern OR	1.6	3.0	1.9	200,401	35,365	235,766
Eastern Oregon	0.9	2.3	2.6	151,114	26,667	177,781
Statewide				2,100,632	539,818	2,640,450



Adding across all OHV households in Oregon, a total of 229,373 days were spent in the North Coast region on OHV trips. It is assumed that 34% of all OHV use in the South Coast region is from out-of-state visitors and 15% of use in other regions is from out-of-state visitors. For example, the 40,478 out-of-state trip days for the North Coast is 15% of the 269,851 total trip days in that region. The South Coast percentage comes from recent survey research⁵ while the “everywhere else” percentage is based on the 1999 report.

⁵ Graefe, A.R. and R.C. Burns. 2007. Off-highway vehicle users' preferences for safety regulations at the Oregon Dunes National Recreation Area. Presentation at the Society of American Foresters convention in Portland, OR. Slide 15.

Combined, there was a total of 2.6 million household trip days for OHV recreation. This is almost four times the amount estimated in the 1999 report, which reflects a larger number of OHV households and a larger number of trip days per household.

As expected given the presence of the Oregon Dunes National Recreation Area, the South Coast region received the largest number of in-state trips and days per OHV household, as well as the largest number of trip days. Central Oregon was the next most popular destination region. Eastern Oregon experienced the longest trips, with 2.6 days per trip on average.

Trip expenditure is evaluated using an economic impact approach, one that focuses on “new money” resulting from OHV recreational riding. Respondents were asked about their most recent trip, including how their trip would be affected if the OHV site they had visited had not been available (Question 17).

For local residents, trip expenditure was excluded if the respondent would have stayed at home (Response 1) or done something else in the same region (Response 4). Trip expenditure was included if the respondent would have gone to a different region (Response 3 or 5). As a reminder, local residents are those living and riding in the same region; this can involve day or overnight trips, and it can involve riding directly from one’s residence or at a location 100 miles away.

Response 2 reflects travel to a different OHV site in the same region and is a “grey area” of behavior. The question was written to focus on one site, rather than the whole region, as it is difficult to envision a situation in which a region provides no OHV riding areas at all. The survey contained Response 2 since this is a likely behavior in such a situation (in fact, it was the most common response). For local resident trips involving Response 2, only the OHV percentage of the expenditure (Q16) is included. Across all regions, the average OHV percentage was 84% for local trips.

For non-local in-state and for out-of-state respondents, all expenditure was included for Response 1, 3, and 5. The OHV percentage of expenditure was included for Response 2 and 4. Across all regions, the average OHV percentage was 74% for non-local in-state trips and 87% for out-of-state trips.

Some (5%) in-state respondents did not report either the origin region or the destination. Of the remaining, 44% of the most recent trips were local (origin and destination regions were the same) and 56% were nonlocal.

Note that trip expenditure included both spending at home (e.g., gas and food purchased for the trip) and en-route and at the destination (e.g., gas, restaurants, lodging). Amounts spent at home were allocated to the origin region; amounts spent en-route or at the destination were allocated to the destination region.

Expenditure patterns were calculated by origin and by destination for in-state respondents. OHV riders traveling from Southern Oregon to the South Coast may have different spending patterns than those traveling from the Willamette Valley to the South Coast. These differences were included in the analysis. Because of the small sample size, expenditure patterns for out-of-state respondents were calculated across all Oregon destination regions combined.

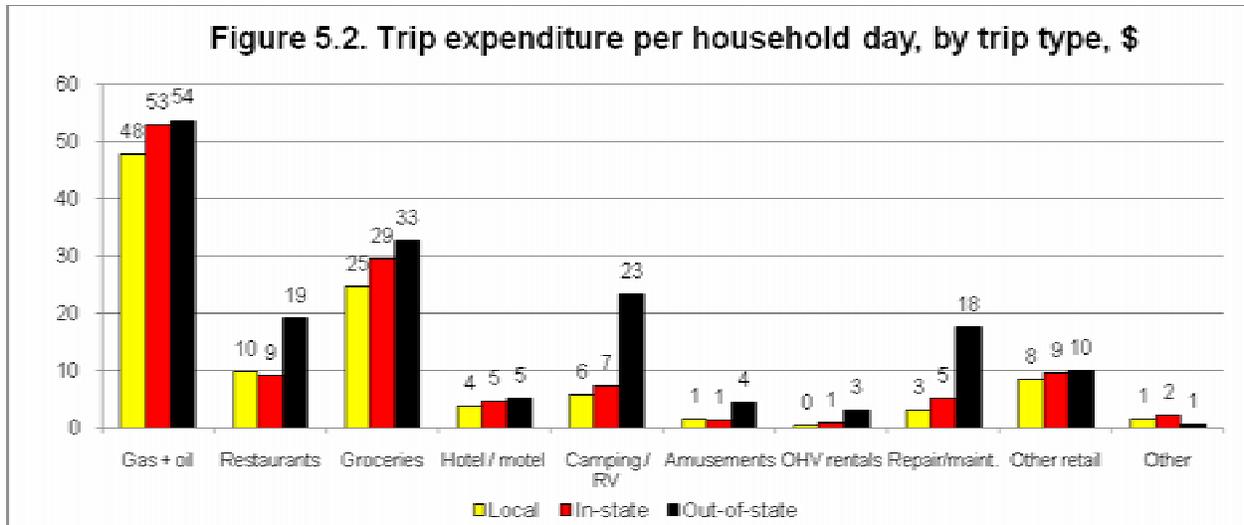
Table 5.3 presents expenditure estimates for this 2008 analysis compared to the 1999 analysis and the U.S. Forest Service National Visitor Use Monitoring (NVUM) national average figures. The 2008 estimates are broken into Local, In-state non-local, and Out-of-state categories. The

first two include both “at home” and “at destination” expenditure, while out-of-state only includes “at destination” expenditure. The 1999 estimates are averages across all visitor types. The 2008 and 1999 estimates are per household per day. The NVUM estimates are in party trips per day, with an assumed trip length of two days for Non-local overnight visitors. NVUM estimates reflect spending only in the destination’s local region (with “local” defined for both spending and type of visitor as within approximately 50 miles of the survey point). The NVUM and 1999 estimates are inflation adjusted to 2008, using the CPI for all non-gas items. Gas items were inflation adjusted using average price per gallon in the first week of June for the respective year.

	Oregon 2008			Oregon 1999	NVUM	
	Local	In-state non-local	Out-of-state	All	Local day	Non-local overnight
Gas + oil	48	53	54	123	44	58
Restaurants	10	9	19	19	8	17
Groceries	25	29	33	40	7	21
Hotel / motel	4	5	5	8	0	13
Camping / RV	6	7	23	10	Included in hotel / motel	
Amusements	1	1	4	3	5	7
OHV rentals	0	1	3	1		
Repair/maint.	3	5	18	4		
Other retail	8	9	10	9	4	11
Other	1	2	1	0		
Total	106	122	169	216	69	127

In absolute terms, 1999 gas/oil expenditure was only \$35 per household per day. However, on a price-adjusted dollar basis, fuel expenditure was much greater in 1999. Differences between 1999 and 2008 are less noticeable in other spending categories. It is more difficult to compare with NVUM averages, as these are national figures with different trip and expenditure categories. For example, a Local trip in the 2008 data may be overnight whereas it is a day trip in these NVUM figures. Nonetheless, results are broadly consistent, especially between 2008 In-state and NVUM Non-local overnight results.

Expenditure by trip type (the first three numeric columns of Table 5.3) is shown graphically in Figure 5.2.



Expenditure by region is shown in Table 5.4. Non-local expenditure includes both non-local in-state travel and out-of-state travel. The sum across regions is \$250 million. This is 5.4 times the amount estimated in the 1999 analysis. Part of this growth is due to the increased number of OHV households. Part is due to inflation, and, especially, higher gas prices (Figure 5.2 illustrates that gas represents a large part of 2008 trip expenditure). Part is due to the more inclusive approach to including trip expenditure, especially for local trips.

Table 5.4. OHV trip expenditure, 2008, millions of dollars

	Local	Non-local	Total
Sum across regions	79.5	170.7	250.2
North Coast	12.8	20.5	33.3
Central Coast	0.2	10.6	10.8
South Coast	13.5	67.8	81.4
Willamette Valley	14.2	19.4	33.6
Central Oregon	11.6	21.8	33.4
Southern Oregon	17.2	13.1	30.3
Northeastern OR	9.7	8.3	18.1
Eastern Oregon	0.2	9.2	9.4

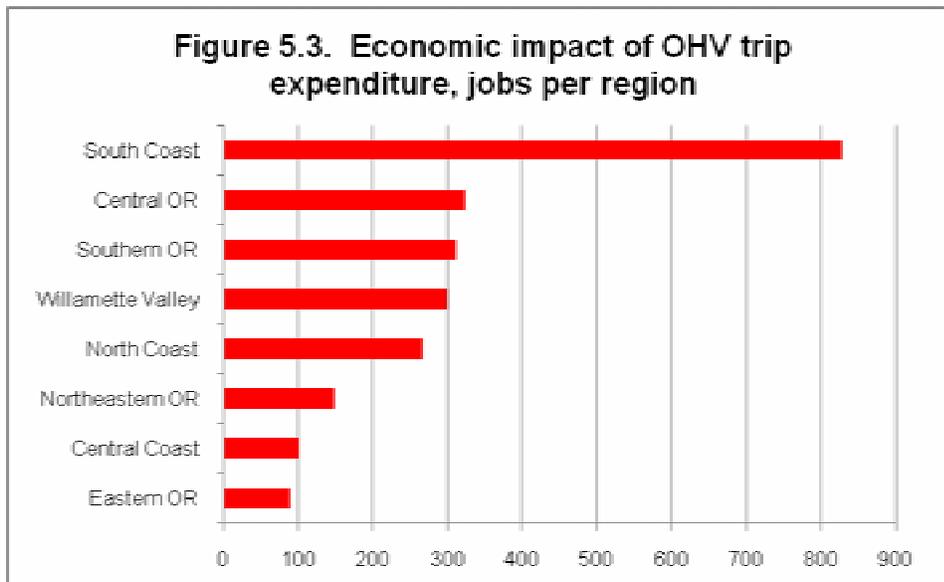
This expenditure led to the impacts reported in Table 5.5 and shown (for jobs) in Figure 5.3. OHV trip expenditure generates \$64 million in labor income and supports 2,369 jobs. This represents approximately 1.9% of all labor income generated from travel in Oregon.⁶

As with trip expenditure, the statewide total would not equal the simple sum of the regions. In part, this is for the reason noted above – that multiplier effects of a given expenditure would be greater at the state level than at the level of any single region due to differing linkages. However, there is the additional effect that local and non-local trips are treated differently in expenditure allocation, and many non-local trips at the region level (e.g., a rider from

⁶ Dean Runyan Associates. 2009. Oregon Travel Impacts, 1991-2008p. Report prepared for the Oregon Travel Commission. Note that the methodological approach differs in that study, so this percentage is approximate.

Northeastern Oregon riding in Eastern Oregon) would be local trips at the state level. If one takes a statewide “accounting stance,” impacts will be reduced, as local trips are treated more conservatively than are non-local trips.

Table 5.5. Economic impacts of 2008 trip expenditure, output and labor income in millions of dollars			
	Output	Labor Income	Jobs
Sum across regions	245.1	64.1	2,369
Willamette Valley	33.8	10.0	300
Central OR	34.1	9.0	322
Northeastern OR	15.7	3.5	149
Eastern OR	8.3	1.9	89
Southern OR	32.2	8.5	312
South Coast	77.9	19.6	829
Central Coast	9.8	2.4	100
North Coast	33.4	9.3	268



Appendix A: Impact model steps and assumptions

The following steps were used in estimating the multiplier effects of OHV household expenditure.

1. An IMPLAN model was created for each region (e.g., Willamette Valley), with 2006 economic structure data. IMPLAN models are constructed from whole counties, so coastal Lane and coastal Douglas were included in the Willamette Valley model, not the South Coast model.
2. IMPLAN default values were used and Type SAM multipliers were created. These multipliers treat households as endogenous and thus include induced effects.
3. An impact scenario was created by allocating expenditure into relevant IMPLAN categories (this is known as bridging). For example, equipment expenditure was allocated to IMPLAN 361 (for OHV vehicles), 349 (trailers), 344 (tow vehicles), 401 (maintenance, modifications, accessories), 428 (insurance), 400 (storage), and 410 (other). All retail categories were margined. IMPLAN links the ATV manufacturing sector (361) with the sporting goods retail sector (409). This margin was re-allocated to the motor vehicle sector (401, which includes NAICS 44122) based on that sector's average margin.
4. Impact estimates were generated. Expenditure data are in 2008 dollars, which were adjusted in IMPLAN to 2006 dollars to match the model data file. Impact results are shown in 2008 dollars using the IMPLAN deflators to convert back from 2006 to 2008.

Input-output analysis assumptions

IMPLAN is based on input-output (IO) analysis and is widely used to estimate the economic significance of tourism, recreation, and other activities. It uses a combination of local data (e.g., employment in each sector) and national data (e.g., average production relationships) to create a "picture" of the study area economy, including the linkages between economic sectors.

The IO approach involves several assumptions. These assumptions generally are not met in their entirety, but IO (and IMPLAN in particular) provides a good balance between practicality and accuracy. That is particularly true in cases, such as the present, in which the impact being evaluated is a small proportion of the overall study area economy. In such cases, non-linearities can be reasonably approximated with the linear relationships inherent in IO.

IO assumptions include the following.

1. All businesses within each sector produce a single, homogeneous product or service; the input procedures used in the production process are identical. That is, the economy should be disaggregated so that each sector is producing the same good.
2. An increase of production will lead to purchase of inputs in the proportions shown in the technical coefficients matrix. In technical terms, the production function is linear and homogeneous. This assumption restricts economies of scale; IO analysis assumes a business always will use the same proportion of inputs regardless of how much it grows.
3. When households are included in the analysis (as is done for this analysis), their spending patterns (consumption functions) also are assumed to be linear and homogeneous.

4. The structure of the economy will not change. Many input-output models, including the one used here, are static in nature. They are based on data from a single year (in this case 2006) and yet are used to estimate impacts in other years. Dramatic structural changes in the economy would invalidate this assumption. Oregon has been in recession, but this is assumed to be a temporary phenomenon that does not involve substantial structural changes to the regional economies.

5. When IO is used to estimate the effect of changes in final demand (as in the present case), there must be unemployed resources available to be brought into the sector as inputs.

Appendix B

This appendix includes the resident (in-state) formats of the surveys, with Version 1 presented first and Version 2 presented second. The non-resident (out-of-state) formats were the same with respect to the economic impact questions used for this analysis.

2008 OREGON OFF-HIGHWAY VEHICLE (OHV) FUEL USE SURVEY

IMPORTANT! PLEASE READ BEFORE ANSWERING THE SURVEY.

Below is the permit number issued to you for operation of an off-highway vehicle (OHV) you own or have owned in the past. OHVs include quads and three-wheel ATVs (Class I), dune buggies, sand rails and 4x4 vehicles (Class II), and off-road motorcycles (Class III). Snowmobiles are not included. Even though you may own other vehicles with ATV operating permits, please answer questions 1 through 7 thinking only about the vehicle identified by the permit number given below.

Fuel tax questions omitted.

8. The remaining questions relate to all OHVs owned by yourself or other members of your household – not just the one with the permit number listed above.

8a. Did you or anyone in your household ride an OHV (not just the one described by the permit number above) on PUBLIC LAND in Oregon for recreational purposes from January 1, 2008 through December 31, 2008? *(Circle one number)*

1 NO, NO OHVS WERE USED ON PUBLIC LAND IN OREGON →

This is all the information we need from you at this time. Please return your survey in the postage-paid envelope provided.

↙ 2 YES, AT LEAST ONE OHV (the one above or other) WAS USED ON PUBLIC LAND IN OREGON

Continue with Question 9 on the next page

9. For each person in your household who participated in recreational OHV riding on public lands in Oregon in the past 12 months, please circle their gender and then write their age.

RIDER	GENDER	CURRENT AGE (in years)
1. Yourself	Male Female	<input type="text"/>
2. Other household OHV rider	Male Female	<input type="text"/>
3. Other household OHV rider	Male Female	<input type="text"/>
4. Other household OHV rider	Male Female	<input type="text"/>
5. Other household OHV rider	Male Female	<input type="text"/>
6. Other household OHV rider	Male Female	<input type="text"/>

10. What types of areas do you and other household riders commonly ride in Oregon? (Circle YES or NO for each area)

- a. Dunes or beach... YES NO
- b. Forest..... YES NO
- c. Desert YES NO
- d. Other (*Describe* _____)

11. How much did you and other household riders spend on OHV related items in Oregon in the past 12 months (January 1, 2008 through December 31, 2008)? Do not include spending on fuel or while taking OHV trips. If no money was spent on an item, please write in "0."

ITEM	AMOUNT SPENT ON ITEM
A. OHV vehicle(s) purchased	\$ <input type="text"/>
B. OHV trailer(s) purchased	\$ <input type="text"/>
C. Insurance for OHV vehicle(s) and trailer(s)	\$ <input type="text"/>
D. Storage for OHV vehicle(s) and trailer(s)	\$ <input type="text"/>
E. Repair, maintenance, parts/labor	\$ <input type="text"/>
F. Modifications/upgrades (exhaust, wheels/tires, winch, lights, etc.)	\$ <input type="text"/>
G. Accessories & apparel (covers, helmets, clothing, etc.)	\$ <input type="text"/>
H. Other (<i>Describe</i> _____)	\$ <input type="text"/>

12. What percent (%) of the total amount you spent on OHVs in Oregon, as described in Question 11, was for recreational riding in Oregon – rather than for work, driving on normal roads, or riding in other states? If all the money spent was for recreational OHV riding in Oregon, please write "100."

_____ % FOR RECREATIONAL RIDING IN OREGON

13. In the past 12 months did you purchase a new or used vehicle (car, truck, van, or RV) in Oregon?

1 NO

2 YES → 13a. What was the purchase price of this vehicle? \$ _____

13b. Was one of the reasons for purchasing this vehicle to tow an OHV?

1 NO

2 YES

→ 13c. Would you have purchased this vehicle anyway, even if it were not to be used for towing an OHV?

1 NO, WOULD NOT HAVE PURCHASED A VEHICLE AT ALL

2 YES, WOULD HAVE PURCHASED THIS SAME VEHICLE

3 NO, WOULD HAVE PURCHASED A DIFFERENT VEHICLE

→ 13d. How much MORE or LESS money would you have spent on the other vehicle? (*Circle one number and fill-in amount where applicable*)

1 I WOULD HAVE SPENT \$ _____ MORE

2 I WOULD HAVE SPENT \$ _____ LESS

3 I WOULD HAVE SPENT ABOUT THE SAME AMOUNT

4 I DON'T KNOW

14. In which Oregon county do you currently live? If you do not live in Oregon, check the box below and continue with Question 15.

I DO NOT LIVE IN OREGON

(If you live in Oregon, please circle one number)

- | | | | |
|--------------|---------------|--------------|---------------|
| 01 Baker | 10 Douglas | 19 Lake | 28 Sherman |
| 02 Benton | 11 Gilliam | 20 Lane | 29 Tillamook |
| 03 Clackamas | 12 Grant | 21 Lincoln | 30 Umatilla |
| 04 Clatsop | 13 Harney | 22 Linn | 31 Union |
| 05 Columbia | 14 Hood River | 23 Malheur | 32 Wallowa |
| 06 Coos | 15 Jackson | 24 Marion | 33 Wasco |
| 07 Crook | 16 Jefferson | 25 Morrow | 34 Washington |
| 08 Curry | 17 Josephine | 26 Multnomah | 35 Wheeler |
| 09 Deschutes | 18 Klamath | 27 Polk | 36 Yamhill |

15. What else would you like to say about riding OHVs in Oregon?

**THANK YOU FOR YOUR COOPERATION!
PLEASE RETURN YOUR QUESTIONNAIRE IN THE POSTAGE-PAID ENVELOPE PROVIDED**

2008 OREGON OFF-HIGHWAY VEHICLE (OHV) FUEL USE SURVEY

IMPORTANT! PLEASE READ BEFORE ANSWERING THE SURVEY.

Below is the permit number issued to you for operation of an off-highway vehicle (OHV) you own or have owned in the past. OHVs include quads and three-wheel ATVs (Class I), dune buggies, sand rails and 4x4 vehicles (Class II), and off-road motorcycles (Class III). Snowmobiles are not included. Even though you may own other vehicles with ATV operating permits, please answer questions 1 through 7 thinking only about the vehicle identified by the permit number given below.

Fuel tax questions omitted.

8. The remaining questions relate to all OHVs owned by yourself or other members of your household – not just the one with the permit number listed above.

8a. Did you or anyone in your household ride an OHV (not just the one described by the permit number above) on PUBLIC LAND in Oregon for recreational purposes from January 1, 2008 through December 31, 2008? *(Circle one number)*

1 NO, NO OHVS WERE USED ON PUBLIC LAND IN OREGON →

This is all the information we need from you at this time. Please return your survey in the postage-paid envelope provided.

↙ 2 YES, AT LEAST ONE OHV (the one above or other) WAS USED ON PUBLIC LAND IN OREGON

Continue with Question 9 on the next page

9. In which Oregon county do you currently live? If you do not live in Oregon, check the box below and then skip to Question 11.

I DO NOT LIVE IN OREGON → **Skip to question 11**

(If you live in Oregon, please circle one number)

- | | | | | |
|--------------|---------------|--------------|--------------|---------------|
| 01 Baker | 08 Curry | 15 Jackson | 22 Linn | 29 Tillamook |
| 02 Benton | 09 Deschutes | 16 Jefferson | 23 Malheur | 30 Umatilla |
| 03 Clackamas | 10 Douglas | 17 Josephine | 24 Marion | 31 Union |
| 04 Clatsop | 11 Gilliam | 18 Klamath | 25 Morrow | 32 Wallowa |
| 05 Columbia | 12 Grant | 19 Lake | 26 Multnomah | 33 Wasco |
| 06 Coos | 13 Harney | 20 Lane | 27 Polk | 34 Washington |
| 07 Crook | 14 Hood River | 21 Lincoln | 28 Sherman | 35 Wheeler |
| | | | | 36 Yamhill |

10. Now please look at the map that was enclosed with your survey and indicate in which region you currently live. *(Circle one number)*

- | | | | |
|-----------------|---------------------|-------------------|-----------------------|
| 1 North Coast | 3 South Coast | 5 Central Oregon | 7 Northeastern Oregon |
| 2 Central Coast | 4 Willamette Valley | 6 Southern Oregon | 8 Eastern Oregon |

11. Please write in the number of trips you and others in your household took in the past 12 months (January 1, 2008 – December 31, 2008) in each of the regions shown on the Oregon map insert. Only include trips that involved recreational OHV riding on public lands. Include even very short trips close to home, such as riding on BLM or U.S. Forest Service land near your house. If a trip crossed over more than one region, please use the region where you spent the most time. Next, please add together the days you spent on all of these OHV riding trips during this 12-month period for each region and write the number in the right-hand column. **(Example: One two-day trip and one three-day trip in the SOUTH COAST would equal 2 TRIPS and 5 DAYS ALTOGETHER in that region)**

REGION	NUMBER OF TRIPS IN PAST 12 MONTHS	NUMBER OF DAYS SPENT ALTOGETHER IN THIS REGION
A. NORTH COAST	<input type="text"/>	<input type="text"/>
B. CENTRAL COAST	<input type="text"/>	<input type="text"/>
C. SOUTH COAST	<input type="text"/>	<input type="text"/>
D. WILLAMETTE VALLEY	<input type="text"/>	<input type="text"/>
E. CENTRAL OREGON	<input type="text"/>	<input type="text"/>
F. SOUTHERN OREGON	<input type="text"/>	<input type="text"/>
G. NORTHEASTERN OREGON	<input type="text"/>	<input type="text"/>
H. EASTERN OREGON	<input type="text"/>	<input type="text"/>

12. Referring to the map again, in which region was your last recreational OHV trip on public land in Oregon? *(Circle one number)*

- | | | | |
|-----------------|---------------------|-------------------|-----------------------|
| 1 North Coast | 3 South Coast | 5 Central Oregon | 7 Northeastern Oregon |
| 2 Central Coast | 4 Willamette Valley | 6 Southern Oregon | 8 Eastern Oregon |

13. How many days did you spend, in total, on this last trip? If the trip was less than one day, please write "1."

_____ DAY(S) ON MY LAST TRIP IN OREGON

14. How many household members, including yourself, were on this last trip in Oregon? Please do not include anyone outside your household.

_____ **HOUSEHOLD MEMBERS ON THIS TRIP, INCLUDING MYSELF**

15. How much did you and other household members spend on this last trip? There are two columns for you to report your expenditures—in the first column write in the amount of money spent at home in preparation for the trip. In the second column, write how much was spent en-route (on the way) and at this destination combined. If this trip was a short trip near your home, it is possible that you had little or no expenditure.

ITEM	AMOUNT SPENT AT HOME	AMOUNT SPENT EN-ROUTE AND AT DESTINATION
A. Gas and oil (for OHV and tow vehicle)	\$ _____	\$ _____
B. Restaurants and bars	N/A	\$ _____
C. Food & drinks purchased at grocery or convenience stores	\$ _____	\$ _____
D. Hotels/motels	N/A	\$ _____
E. Camping/RV/bed & breakfasts	N/A	\$ _____
F. Amusements/attractions	N/A	\$ _____
G. OHV rentals	\$ _____	\$ _____
H. Repairs/maintenance during trip	N/A	\$ _____
I. Other retail (clothing, souvenirs, equipment, etc.)	\$ _____	\$ _____
J. Other (Describe _____)	\$ _____	\$ _____

16. What percent of the trip expenditures was spent on the OHV portion of your trip (as opposed to spending related to visiting family, friends, or attractions other than OHV sites)?

_____ **% SPENT ON THE OHV PORTION OF THIS TRIP**

17. Assume that the OHV site you visited on this trip had not been available. What would you have done instead? (**Circle one number**)

- 1 **STAYED AT HOME**
- 2 **GONE TO A DIFFERENT OHV SITE IN THE SAME REGION**
- 3 **GONE TO AN OHV SITE IN A DIFFERENT REGION OR STATE**
- 4 **DONE SOMETHING ELSE (NOT GONE OHV RIDING) IN THE SAME REGION**
- 5 **DONE SOMETHING ELSE (NOT GONE OHV RIDING) IN A DIFFERENT REGION**

Q18. What else would you like to say about riding OHVs in Oregon?

THANK YOU FOR YOUR COOPERATION!
PLEASE RETURN YOUR QUESTIONNAIRE IN THE POSTAGE-PAID ENVELOPE PROVIDED