Highway Cost Allocation Study 2013-2015 Biennium

Final Draft

Prepared for
Oregon Department of
Administrative Services,
Office of Economic Analysis

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Summary of Major Findings

The 2013 Oregon Highway Cost Allocation Study finds that:

- Light vehicles (those weighing 10,000 pounds or less) paying full fees should pay 65.9 percent of state highway user revenues, and heavy vehicles (those weighing more than 10,000 pounds) paying full fees should contribute 34.1 percent during the 2013-15 biennium.
- For the 2013-15 biennium and under existing, current-law tax rates, it is projected that full-fee-paying light vehicles will contribute 65.0 percent of state highway user revenues and full-fee-paying heavy vehicles, as a group, will contribute 35.0 percent.
- The calculated equity ratios for full-fee-paying vehicles, defined as the ratio of projected payments to responsibilities for the vehicles in each class, are 0.9871 for light vehicles and 1.0250 for heavy vehicles as a group. This means that, under existing tax rates and fees, light vehicles are projected to underpay their responsibility by 1.3 percent. Heavy vehicles, as a group, are projected to overpay their responsibility by 2.5 percent during the next biennium.
- The equity ratios for the individual heavy vehicle weight classes show some classes are projected to overpay and some to underpay their responsibility during the 2013-15 biennium. Chapter 7 of this report offers alternative fee schedules that would minimize this cross-subsidization of some heavy vehicle weight classes by others.
- The reduced rates paid by certain types of vehicles, principally publicly owned and farm vehicles, mean these vehicles are paying lower per-mile charges than comparable vehicles subject to full fees.
- The equity ratios reported here are for vehicles that pay full fees. In previous studies, the difference between amounts expected to be collected from vehicles that pay reduced rates and the amount that would be collected from them if they paid full fees was treated as a "cost" and was allocated to full-fee-paying vehicles. The effect of doing so again in this study is reported in Chapter 6.

2011-13 Oregon Highway Cost Allocation Study

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Chapter 1

Introduction and Background

Cost responsibility is the principle that those who use the public roads should pay for them and, more specifically, that users should pay in proportion to the road costs for which they are responsible. Cost responsibility requires each category of highway users to contribute to highway revenues in proportion to the costs they impose on the highway system. Cost allocation is the process of apportioning the cost of highway work to the vehicles that impose those costs and is therefore necessary for the implementation of the cost responsibility policy of the State of Oregon.

For more than 70 years, Oregon has based the financing of its highways on the principle of cost responsibility. This tradition has served Oregon well by ensuring that the state's highway taxes and fees are levied in a fair and equitable manner. Periodic studies have been conducted to determine the "fair share" that each class of road users should pay for the maintenance, operation, and improvement of the state's highways, roads, and streets. Prior to the present study, 17 such studies had been completed; the first in 1937, the most recent in 2011.

Oregon voters ratified the principle of cost responsibility in the November 1999 special election by voting to add the following language to Article IX, Section 3a (3) of the Oregon Constitution:

"Revenues . . . that are generated by taxes or excises imposed by the state shall be generated in a manner that ensures that the share of revenues paid for the use of light vehicles, including cars, and the share of revenues paid for the use of heavy vehicles, including trucks, is fair and proportionate to the costs incurred for the highway system because of each class of vehicle. The Legislative Assembly shall provide for a biennial review and, if necessary, adjustment, of revenue sources to ensure fairness and proportionality."

Purpose of Study

The purpose of this 2013 Oregon Highway Cost Allocation Study (HCAS) is to

(1) determine the fair share that each class of road users should pay for the maintenance, operation, and improvement of Oregon's highways, roads, and streets; and

(2) recommend adjustments, if necessary, to existing tax rates and fees to bring about a closer match between payments and responsibilities for each vehicle class.

Past Oregon Highway Cost Allocation Studies

Oregon, more than any other state, has a long history of conducting highway cost allocation or responsibility studies and basing its system of road user taxation on the results of these studies. Studies were completed in 1937, 1947, 1963, 1974, 1980, 1984, 1986, 1990, 1992, 1994, 1999, 2001, 2003, 2005, 2007, 2009, and 2011. As noted above, the Oregon Constitution now requires that a study be conducted biennially and highway user tax rates adjusted, if necessary, to ensure fairness

and proportionality between light and heavy vehicles.

Prior to 1999, Oregon used the term *cost responsibility studies*, whereas the federal government and most other states called their studies *cost allocation studies*. Oregon has now adopted the more conventional terminology, although the two terms are essentially equivalent and used interchangeably in this report.[1]

In this and all prior studies, highway users and other interested parties have been given the opportunity to offer their input in an open and objective process. During the 1986 Study, for example, three large public meetings were held to provide information on the study and solicit the input of all user groups.

As part of the 1994 Study process, a Policy Advisory Committee was formed to address several cost responsibility issues that arose during the 1993 legislative session. This committee consisted of 12 members, including a representative of AAA Oregon and five representatives of the trucking industry. The committee held six meetings devoted to understanding and recommending policies for the 1994 Study as well as future Oregon studies.

In 1996, the Oregon Department of Transportation (ODOT) formed the Cost Responsibility Blue Ribbon Committee to evaluate the principles and methods of the Oregon cost responsibility studies and, if warranted, recommend improvements to the existing methodology. This 11-member committee was chaired by the then Chairman of the Oregon Transportation Commission and included representatives of the trucking industry, AAA Oregon, local governments, academia, and Oregon business interests. The committee held a total of seven meetings and reached agreement on a number of recommendations for future studies. Because the trucking industry, in some cases, did not agree with the full committee recommendations, it was given the opportunity and elected to file a Minority Report that was included in the committee report.

All studies prior to 1999 were conducted by ODOT staff. In February 1998, the ODOT and Oregon Department of Administrative Services (DAS) Directors reached agreement to transfer responsibility for the study from ODOT to DAS. The 1999, 2001, 2005, 2007, 2009, and 2011 studies, as well as the current study, were conducted by consultants to the DAS Office of Economic Analysis. ODOT's role in these studies was to provide technical assistance and most of the data and other required information. In 2003, ODOT conducted the study using the model developed for the 2001 Study.

The Oregon studies prior to 1999 relied on an internal technical advisory committee to provide the expertise and some of the many data elements required for the studies. As noted, highway users and other interested parties were also provided the opportunity to offer their input as the studies were being conducted. For the 1999 and subsequent studies, DAS formed a Study Review Team (SRT) to provide overall direction for the studies. The SRT's role has been to provide policy guidance and advisory input on all study methods and issues.

The SRT for the 2001 Study consisted of ten members and the SRTs for the 2003 and 2005 studies had eight members. The SRT for the 2007, 2009 and the present study consisted of ten members. The composition of the SRTs has changed from study to study, but all have included motorist, trucking industry, and Oregon business representatives; academics; and state officials. All SRTs have been chaired by the State Economist. ODOT did not

[1] It should be noted that, to be precise, neither term is technically correct. Since all previous state studies, including Oregon's, have allocated expenditures rather than actual costs imposed, they are really *expenditure allocation studies*. The 2011 Efficient Fee Study, performed for Oregon during the last biennium, was to our knowledge the first state-level study to estimate and allocate the actual costs of highway use.

have a representative on the 1999 SRT, but was represented on subsequent SRTs.

Other Highway Cost Allocation Studies

Although Oregon has the longest history of conducting highway cost allocation studies, a number of other states have also conducted such studies, the majority of which have been completed over the past two decades. Since the first HCAS, 32 states have performed at least 87 cost allocation studies. Since the late 1970s, 30 states have conducted such studies.

The interest of other states in undertaking these studies has in many cases been sparked by the completion of similar studies by the federal government. Several states undertook studies following the release of the 1982 Federal HCAS. With the release of the 1997 Federal HCAS and the Federal Highway Administration's (FHWA) interest in helping states do their own studies, there was again a renewed interest among the states. Upon completion of the 1997 Federal Study, FHWA formed a state representatives' Steering Committee to assist the states in adopting the research and methods employed in that study.

A 1996 Oregon Legislative Revenue Office report concluded that most of the differences in study results among states can be explained by differences in the types of expenditures that are allocated.[2] Oregon, for example, does not include state police expenditures in its studies because, since 1980, state police do not receive Highway Fund monies. California, on the other hand, includes large Highway Patrol expenditures in its studies. Since policing expenditures are typically viewed as a common responsibility of all highway users and are assigned to all vehicle classes on the basis of each class's relative travel, they are predominantly the responsibility of automobiles and other light vehicles. Therefore, it is not surprising that the California studies find a higher light and lower heavy vehicle responsibility share than the Oregon studies.

A review of state studies conducted in connection with the 1997 Federal Study found that those studies attempting to clearly allocate costs between light and heavy vehicle classes have commonly found heavy vehicles to be responsible for 30 to 40 percent of total highway expenditures. The past several Oregon studies have produced results in this range. Both the 1982 and 1997 Federal HCASs found trucks and other heavy vehicles to be responsible for 41 percent of federal highway expenditures.[3]

Oregon Road User Taxation

Oregon's constitutionally dedicated State Highway Fund derives most of its revenue from three major highway user taxes: vehicle registration fees, motor vehicle fuel taxes (primarily the gasoline tax), and motor carrier fees (primarily the weight-mile tax). The basis of each of these taxes is governed by the concept of cost responsibility. This three-tiered structure is used to collect a fair share of revenue from each highway user class.

Road user taxes were initially levied against motor vehicles to cover the cost of registration. A one-time fee of $3 was instituted in 1905. Because this proved to be a productive source of revenue, the state soon annualized the fee and began to increase the rates and use the proceeds to finance highways.

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[2] "Oregon Cost Responsibility Studies Compared to Other States," Legislative Revenue Office Research Report #4-96, September 10, 1996.

[3] It should be noted, however, that the results of the federal studies are not directly comparable to those of state studies for two reasons: highway maintenance is largely a state-funded activity and thus is not included in the federal studies, and the heavy vehicle responsibility share is generally lower for most maintenance activities than for construction, particularly major rehabilitation projects. Therefore, the responsibility for federal expenditures will typically be more weighted toward heavy vehicles than is the case for state expenditures.

The registration fee was considered payment for the fixed or non-use related costs of providing a highway system. These costs include minimal maintenance of facilities and equipment along with certain administrative functions necessary to keep the system accessible. Since these costs account for a small portion of total highway costs, registration fees in Oregon have traditionally been low (for both cars and trucks) in comparison to the corresponding fees in most other states. From 1990 to 2003, the two-year registration fee for automobiles and other vehicles weighing 8,000 pounds or less was $30, and in 2004, it was increased to $54. It is currently $86 biennially. This shift to relatively higher registration fees represents a change in philosophy away from the "user pays" approach and toward the use of fixed fees to cover more of the variable costs of road construction and maintenance.

The second tier in the Oregon system is the fuel tax. In 1919, Oregon became the first state in the nation to enact a fuel tax on gasoline. It was regarded as a "true" road user tax because those who used the roads more paid more. The fuel tax came to be viewed as the most appropriate means of collecting the travel-related share of costs for which cars and other light vehicles are responsible.

The state fuel tax was extended to diesel and other fuels in 1943. Since that time, the tax on diesel and other fuels, referred to as a "use fuel" tax, has been at the same rate per gallon as the tax on gasoline. On January 1, 2011, Oregon's fuel tax rate increased from $0.24 per gallon to $0.30 per gallon. The last time it was increased was in 1993.

The third tier in the Oregon highway finance system is the weight-mile tax. Oregon's first third-structure tax was put into effect in 1925 in the form of a ton-mile tax. It was used to cover the responsibility of the growing number of trucks and other heavy vehicles appearing on the public roadways at that time.

Oregon's first weight-mile tax was enacted in 1947 and implemented in 1948. The tax applies to all commercial motor vehicles with declared gross weights in excess of 26,000 pounds. It is based on the declared weight of the vehicle and the distance it travels in Oregon. The weight-mile tax is a use tax that takes the place of the fuel tax on heavy vehicles. Vehicles subject to the weight-mile tax are not subject to the state fuel tax.

The Oregon weight-mile tax system consists of a set of schedules and alternate flat fee rates. There are separate schedules for vehicles with declared weights of 26,001 to 80,000 pounds and those over 80,000 pounds. Additionally, log, sand and gravel, and wood chip haulers have the option to pay flat monthly fees in lieu of the mileage tax.

Since 1990, carriers hauling divisible-load commodities at gross weights between 80,001 and 105,500 pounds pay a weight-mile tax (statutory Table B) based on the vehicle's declared weight and number of axles. There are separate schedules for five, six, seven, eight, and nine or more axle vehicles, with each schedule graduated by declared weight. The rates are structured so that, at any declared weight, carriers can qualify for a lower per-mile rate by utilizing additional axles.

Also since 1990, carriers hauling non-divisible loads at gross weights in excess of 98,000 pounds under special, single-trip permits pay a per-mile road use assessment fee. Non-divisible (or "heavy haul") permits are issued for the transportation of very heavy loads that cannot be broken apart, such as construction equipment, bridge beams, and electrical transformers.

The road use assessment fees are expressed in terms of permit gross weight and number of axles and are currently based on a charge of 7.1 cents per equivalent single axle load (ESAL[4]) mile of travel. As with the Table B rates, carriers are assessed a lower per-mile charge the

[4] An ESAL is equivalent to a single axle carrying 18,000 pounds.

greater the number of axles used at any given gross weight. The road use assessment fee takes the place of the weight-mile tax for the loaded, front-haul portion of non-divisible load trips. With rare exceptions, empty back haul miles continue to be subject to the weight-mile tax and taxed at the vehicle's regular declared weight.

In the years since 1947, the weight-mile rates have been adjusted 15 times based on the results of updated cost responsibility studies or the passage of transportation funding packages. The most recent revision occurred on October 1, 2010, when weight-mile rates increased by an average of 24.5 percent as a result of the 2009 Jobs and Transportation Act (JTA). Prior to the 2009 JTA rate increase, the last increase occurred on January 1, 2004, when the 2003 Legislature increased weight-mile rates by approximately 9.9 percent when enacting the third phase of the Oregon Transportation Investment Act (OTIA III). On September 1, 2000, rates were reduced across the board by approximately 12.3 percent to reflect the results of the 1999 Study. The rates were also reduced by 6.2 percent on January 1, 1996, based on the results of the 1994 Study. Before then, rates were increased on January 1, 1992, to maintain equivalency with the fuel tax increases enacted by the 1991 Legislature.

The 1999 Oregon Legislature repealed the weight-mile tax and replaced it with a 29 cent per gallon diesel fuel tax and substantially higher heavy truck registration fees. This measure, House Bill 2082, was subsequently referred to the voters and defeated in the May 2000 primary election.

After the May 2000 vote, the trucking industry challenged the Oregon tax in the courts. The primary focus of the legal action was the feature that allows haulers of logs, sand and gravel, and wood chips to pay alternate flat fees in lieu of the mileage tax. The industry argued that these fees are, from a practical standpoint, available only to Oregon intrastate motor carriers, and this provision of the Oregon system therefore unfairly discriminates against non-Oregon based interstate firms. In February 2002, the Third District Circuit Court ruled in favor of the State in the lawsuit. The ruling was reversed in the Court of Appeals in 2003. The Oregon Supreme Court affirmed the original Circuit Court decision in December 2005.

Organization of this Report

This volume of the 2013 Study provides an overview of the study issues, methodology, and results, as well as recommendations for future studies. There are a number of exhibits throughout this report to illustrate specific data. Please note that amounts shown are rounded and may not total exactly.

This chapter has provided an introductory discussion of the purpose, scope, and process of the 2013 Study as well as a brief background discussion of the history of Oregon highway cost allocation studies, studies by the federal government and other states, and the evolution of Oregon road user taxation.

Chapter 2 briefly summarizes the basic structure and parameters of the 2013 Study, including the analysis periods, road (highway) systems, vehicle classes, revenues attributed, and expenditures allocated to the vehicle classes.

Chapter 3 presents the general methodology and approach used for the study. It includes a description of the special analyses conducted for the study and discussion of the major methodological and procedural changes from previous Oregon studies.

Chapter 4 summarizes the data and forecasts used in the study and compares them to the data and forecasts used in recent studies.

Chapter 5 presents the study expenditure allocation and revenue attribution procedures and results, and compares the methods and results to those of previous Oregon studies.

Chapter 6 brings together the expenditure allocation and revenue

attribution results from the previous chapter to develop ratios of projected payments to cost responsibilities for light vehicles and the detailed heavy vehicle weight classes. It also compares these ratios with those from the 1999, 2001, 2003, 2005, 2007, 2009, and 2011 Oregon studies.

Chapter 7 contains recommendations for changes in existing tax rates and fees to bring about a closer match between revenues contributed and cost responsibilities for each vehicle class.

The appendices to this study are presented in a separate document because of their size. The appendices include:

A. Glossary of terms
B. Issue papers and Bridge Cost Allocation Study
C. The minutes of each SRT meeting
D. HCAS model user guide
E. 2013 model documentation
F. 2013 data and assumptions

Chapter 2

Basic Structure and Parameters of Study

The underlying approach and methods used in this highway cost allocation study are, with a few significant exceptions, similar to those used in the last five Oregon studies. The analytical framework and basic parameters of the 2013 Study are briefly summarized below.

Study Approach and General Methodology

This study uses the cost-occasioned approach, employing an incremental, design-based allocation methodology for bridges and the 2010 version of the National Pavement Cost Model (NAPCOM) for pavement costs. This is the same general approach that was used in previous Oregon studies and virtually all studies conducted by the federal government and other states.

Analysis Periods

Base Year: Calendar Year 2011, the most recent full year for which data were available when the study was undertaken (2012).

Forecast Year: Calendar Year 2014, the middle 12 months of the 24-month study period.

Study Period: The 2013-15 State Fiscal Biennium, or July 1, 2013 to June 30, 2015.

The expenditures allocated are those projected for the 2013-15 biennium using ODOT's Cash Flow Forecast model. All traffic data used in the study were first developed from data for the 2011 base year, and then projected forward to the 2014 forecast year using weight-class-specific growth rates.

Road (Highway) Systems

This study uses the Federal Highway Administration's classification system for highway functional classes. Every public road in Oregon is assigned to one of 12 functional classes:

1. Rural Interstate
2. Rural Other Principal Arterial
3. Rural Minor Arterial
4. Rural Major Collector
5. Rural Minor Collector
6. Rural Local
7. Urban Interstate
8. Urban Other Freeway
9. Urban Other Principal Arterial
10. Urban Minor Arterial
11. Urban Collector
12. Urban Local

Each roadway segment is also assigned to one of four ownership categories: state, county, city, or federal. Note that U.S. Highways and Interstates are owned by the state; federal ownership consists mostly of Forest Service and Bureau of Land Management roads.

In addition to the 12 federal functional classes, we developed three other categories to facilitate the allocation of costs for projects on multiple functional classes or where the functional class was

not known. The additional categories are: all roads, all state-owned roads, and all locally-owned roads.

Vehicle Classes

Light, or basic, vehicles include all vehicles up to 10,000 pounds gross weight, consistent with Oregon law and registration fee schedules. In previous studies, light vehicles were defined as all vehicles up to 8,000 pounds.

Vehicles weighing more than 10,000 pounds are divided into 2,000-pound vehicle classes. All vehicles over 200,000 pounds are in the top weight class. Those over 80,000 pounds are further divided into subclasses based on the number of axles on the vehicle. The five subclasses are five, six, seven, eight, and nine or more axles.

Vehicles over 26,000 pounds are assigned to weight classes based on their declared weight, which may be different from their registered gross weight. For example, a given tractor may operate with different configurations (number and type of trailers) at different times, and may have different declared weights for different configurations.

For modeling purposes, each weight class under 80,000 pounds is assigned a distribution of numbers of axles, and each combination of weight class and number of axles is assigned a distribution of operating weights. For vehicles over 26,000 pounds, these distributions are obtained from Weigh-In-Motion data, data collected by ODOT and supplied by Portland State University, and Special Weighings data supplied by ODOT.[1]

For reporting purposes, the expenditure allocation and revenue attribution results reported in Chapters 5 and 6 are presented in terms of the following seven summary-level vehicle weight groups:

- 1 to 10,000 pounds
- 10,001 to 26,000 pounds
- 26,001 to 78,000 pounds
- 78,001 to 80,000 pounds
- 80,001 to 104,000 pounds
- 104,001 to 105,500 pounds
- 105,501 pounds and up

In this study, as in the 2007, 2009, and 2011 studies, weight classes between 26,001 and 78,000 pounds have been combined into a single group. The only other variation from the groupings used in the 2001, 2003, and 2005 Oregon studies is an increase in the upper weight limit for the lightest weight class from 8,000 to 10,000 pounds. One- to 8,000-pound vehicles accounted for 92.2 percent of vehicle miles traveled in Oregon in 2005; one- to 10,000-pound vehicles accounted for 92.5 percent.

The various weight classes were selected on the basis of the characteristics of the vehicles in each group, logical divisions in the tax structure, and the number of vehicles and miles in each group. Operators of vehicles in the 10,001 to 26,000 pound group, for example, pay the state fuel tax and higher registration fees rather than the weight-mile tax. Additionally, a large majority of these vehicles are two-axle, single-unit trucks or buses used in local commercial delivery operations or passenger transport. Thus, they have relatively similar characteristics with respect to their cost responsibility and tax payments, and it is therefore logical to combine them for reporting purposes.

Similarly, it makes sense to combine the individual weight classes above 105,500 pounds because these vehicles are (a) operated under special, single-trip, non-divisible load permits, (b) operated with multiple axles and legally allowed higher axle weights than regular commercial trucks, (c) subject to the road use assessment fee rather than the weight-mile tax for their loaded front haul miles, and (d) typically used for short-mileage hauls (e.g., transporting heavy equipment from one construction site to another) and so

[1] During a special weighing, every truck passing the weigh station is weighed and the weight recorded, even if the truck is empty.

account for a very small proportion of total truck miles in the state.

The weight classes of 78,001 to 80,000 and 104,001 to 105,500 pounds are by far the largest two truck classes by miles of travel. These two classes alone account for a majority of the total commercial truck miles in Oregon. Because of the dominant role of these two classes in terms of miles of travel, cost responsibilities, and revenue contributions, it is logical they be kept as separate groups.

Expenditures Allocated

State Expenditures

All state expenditures of highway user fee revenues are allocated, as are all state expenditures of federal highway funds (e.g., matching funds). Federal funds are included because they are interchangeable with state user fee revenues. Any differences in the way they are spent are arbitrary and subject to change.

State expenditures of bond revenues are included because the bonds are repaid from state user fees. Such expenditures are, however, reduced to the amount that will be repaid in the study period before these expenditures are allocated. The remaining expenditures will be included in future studies using the allocation to vehicle classes applied in this study, consistent with the approach taken in the 2005, 2007, 2009, and 2011 studies. Thus, expenditures of bond revenues in the last study will be included in this and the next eight studies.

Local Government Expenditures

The study allocates all expenditures by local governments of state highway user fees and federal highway funds. Federal funds are included because, again, they are interchangeable with state user fee revenues.

Some local-government own-source revenues are allocated because they are interchangeable with state highway user fees. The study excludes local-government own-source revenues reported as coming from locally issued bonds, property taxes (including local improvement districts), systems development charges, and traffic impact fees. These revenue sources generally must be spent on certain projects or certain types of projects and are not considered interchangeable with state highway user fees.

In studies prior to 2003, only the expenditures of state highway user fee revenues were allocated. This approach failed to account for the interchangeability of funds from other sources and required local governments to estimate how state funds were spent because their accounting systems do not track expenditures by funding source.

In the 2003 Study, all expenditures by local governments were allocated. The 2005 Study refined the approach taken in the 2003 Study by excluding certain categories of own-source revenue that generally are not interchangeable. This approach was also used in the 2007, 2009, and 2011 studies.

Expenditure Categories

The four major expenditure categories are:

- **Modernization (new construction or reconstruction).** Examples include adding lanes and straightening curves. Modernization generally adds to the capacity of a roadway either directly or by improving the throughput of a facility. A replacement bridge with more lanes than the bridge it replaces is considered modernization.
- **Preservation (rehabilitation).** Most preservation projects involve repaving existing roads. Preservation projects extend the useful life of a facility but generally do not add to its capacity. A replacement bridge that does not add capacity is considered preservation.
- **Maintenance and Operations.** Examples of maintenance include pothole patching, pavement striping, snow and ice removal, and bridge

maintenance. Examples of operations include traffic signals and signage.

- **Administration, Collection, Planning, and Other Costs (everything else).**

Within each of these major categories, expenditures are further broken down into a number of individual work types. Maintenance and Operations, for example, includes 16 individual work types. A separate allocation is performed for the expenditures in each individual work type. Chapter 3 contains a full listing of these work categories and the allocators used for each.

Revenues Attributed

The revenues attributed to vehicles are based on forecast collections for the 2013-15 biennium by major state revenue source under the existing tax structure and current-law tax rates (i.e., current registration and title fees, 30 cent per gallon fuel tax rate, current weight-mile tax, flat fee, and road use assessment fee rates).

Because non-state funding sources are included as expenditures, the total expenditures allocated amount is considerably larger than the total revenues attributed amount. This difference in absolute size does not, however, affect the calculation of equity ratios, which are ratios of ratios (each vehicle class's share of attributed revenues divided by its share of allocated expenditures).

Chapter 3

General Methodology and Study Approach

This chapter presents the general methodology and approach used in the 2013 Oregon Highway Cost Allocation Study.

Cost-Occasioned Approach

All Oregon highway cost allocation studies, as well as the studies conducted by the federal government and most other states, use what is called the cost-occasioned approach. The basic premise of this approach is that each class of road user should pay for the system of roads in proportion to the costs associated with road use by that class. The equity of a road tax system may then be judged by how well shares of payments by different classes of road users match their shares of costs resulting from their use of the road system.

The principal alternative to the cost-occasioned approach is the benefits approach, in which an attempt is made to identify and measure the benefits received by both users and nonusers of the system. The benefits approach begins with the recognition that the purpose of a highway system is to provide benefits, both directly to highway users and indirectly to the rest of society. Basing user fees on the value of benefits received, rather than on the costs imposed, would promote both fairness (people pay in proportion to the value they receive) and efficiency (agencies would have less incentive to build facilities where the costs exceed the benefits). The benefits approach has two major drawbacks: benefits are not directly measurable, and the benefits associated with traveling a mile on a given road can vary greatly between identical-appearing vehicles or individuals and for the same vehicle or person at different times. Additionally, such an approach assumes that the benefits would not otherwise, and more economically, be realized through non-road based modes of transportation.

A long-running debate about the proper balance of cost responsibility and tax burden between highway users and nonusers continues at both the state and federal levels, fueled over the years by numerous studies. Arguments that support charging nonusers for highways are based on the societal benefits attributable to the highway system, including increased mobility, safety, and economic development. There are, however, some serious conceptual problems in quantifying benefits and deciding which accrue to users and which accrue to nonusers. In many cases, highway improvements benefit individuals or businesses simultaneously as both users and nonusers. Additionally, the more readily understood economic impacts of highway improvements often reflect a transfer of user benefits to nonusers—the clearest example being reduced shipping costs, which are passed to businesses and consumers in the form of lower product prices.

Because of these problems, and because of the inherent advantages of user fees in promoting an economically efficient allocation of scarce resources, the federal government and most states conducting

cost allocation studies now rely on a cost-occasioned approach to determine responsibility for highways. The Oregon studies continue to use a cost-occasioned approach.

Incremental Method

Within the cost-occasioned approach, different methods may be used to allocate costs or expenditures to the various vehicle classes. Virtually every recent study, including Oregon's, has used some version of what is referred to as the incremental method. This method divides selected aspects of highway costs into increments, allocating the costs of successive increments to only those vehicles needing the higher cost increment. The design considered adequate for light vehicles only is viewed as a common responsibility of all highway users and is shared by all vehicle classes. Each group of successively larger and heavier vehicles also shares in the incremental costs they occasion.

In Oregon, the incremental method is used directly in the allocation of bridge costs. The first increment for a new bridge, for example, identifies the cost of building the bridge to support its own weight, withstand other non-load-related stresses (e.g., stream flow, high winds, and potential seismic forces), and carry light vehicle traffic only.[1] This cost is a common responsibility of all vehicles and is assigned to all classes on the basis of each class's share of total vehicle miles traveled (VMT). The second increment identifies the additional cost of building the bridge to accommodate trucks and other heavy vehicles weighing up to 50,000 pounds. This cost is assigned to all vehicles with gross weights exceeding 10,000 pounds on the basis of the relative VMT of each class over 10,000 pounds. Similarly, the additional cost of the third increment is assigned to all vehicles with gross weights over 50,000 pounds, and the cost of the fourth and final increment to vehicles having gross weights over 80,000 pounds.

National Pavement Cost Model (NAPCOM)

In the past, highway cost allocation studies typically used an incremental methodology to allocate pavement costs as well. Increased depth and strength of pavement surface and base is required to support increases in the number, and particularly weight, of the vehicles anticipated to use the pavement during its design life.

For the 1997 federal study, Roger Mingo adapted the National Pavement Cost Model (NAPCOM) for use in highway cost allocation. The model had two increments: non-load-related costs and load-related costs, with the load-related costs allocated using results from detailed engineering models of several different pavement degradation mechanisms that take into account the effects of climate, traffic levels, mix of vehicle types, and the interactions between different mechanisms. Mingo adapted the pavement model to use Oregon's special weighings data[2] and to use 2,000-pound increments of declared vehicle weight for data input and results reporting. The allocation of costs in the second increment used the detailed results of the

[1] The factors influencing the design requirements, and therefore costs, of bridges, are sometimes expressed by the terms *dead load*, *live load*, and *total load*. Bridges need to be designed to support their own weight and the other non-load-related forces such as stream flow, wind, and seismic forces (the dead load) plus the traffic loadings anticipated to be applied to the bridge (the live load). The total design load is the sum of the dead and live loads. Although the precise relationships differ by the type and location of the bridge under consideration, as a general rule, the longer the span length, the greater the relative importance of the non-load-related factors in determining the total cost of the bridge.

[2] Special weighings record the weight of every truck passing the scale, even if empty. Weights are reported for each axle grouping, along with the number of axles in the group. These data replace the more generalized assumed distributions of operating weight and vehicle configurations used in the national model.

Oregon-specific pavement cost model, which provides allocation factors by weight class and number of axles for each combination of functional class and pavement type (flexible or rigid).

A new version of NAPCOM was completed in 2010. This version of the model is different from the earlier versions in several ways, though the fundamental idea of incremental allocation of non-load-related and load-related costs is the same. Among the main differences in the newest version of NAPCOM are the new pavement distress models and equations for load-related costs, which have been updated to reflect the current accepted pavement damage models and theories. Load-related costs are allocated using results from newer detailed, empirical engineering models that have been calibrated to pavement distress data.

The 2010 NAPCOM model was used to develop the pavement factors for the 2013 Oregon Study. Similar to the development of pavement factors for past studies, pavement factors were developed by 2,000-pound increments of declared vehicle weight. In addition to the use of Oregon's special weighings data, weigh-in-motion (WIM) data were also used to construct a distribution of operating to declared weight. The 2011 Oregon Highway Cost Allocation Study was the first study to use the new version of NAPCOM to generate pavement factors for highway cost allocation.

The Choice of Appropriate Cost Allocators

Some quantifiable measure, or allocator, must be used to distribute each category of cost, or each increment within a category where the incremental approach is used, to the individual vehicle classes. For many costs, there are logical relationships that suggest a particular allocator as most appropriate.

Wear-related costs are the easiest to allocate. Wear-related costs are a direct, empirically established consequence of use by vehicles. The amount of wear a vehicle imposes per mile of travel generally relates closely to measurable attributes of the vehicle. Two approaches may be used for choosing allocators for wear-related costs.

Results from a detailed model that predicts costs imposed by individual vehicles may be used to develop allocation factors that produce the same attribution of costs as the model. That is how pavement costs are handled in this study.

If a detailed model for attributing wear-related costs does not exist, one may choose allocation factors that one expects to vary in proportion to the wear imposed per unit of use by the vehicles in each category. For example, striping costs are allocated according to axle-miles of travel because it is expected that stripes wear in proportion to the number of axles that pass over them.

For structures and, to a lesser extent, roadways, the cost of constructing a facility with a given capacity will vary with the maximum weight and size of vehicle expected to use it. Part of the difference in construction cost, however, may be offset by increased useful life of a sturdier facility. If one attributes capital costs based on differences in the size or strength of the structure required to accommodate different types of vehicle, then the incremental approach may be used. The incremental approach, by itself, does not account for the capacity demand that drove the decision to build the facility. For bridges and structures, projects that added capacity were identified so that the base increment of the structure cost could be allocated using the peak-period passenger-car-equivalent VMT allocator (peak PCE-VMT). The incremental approach may be modified to take into account the expected effects of structure design on useful life, as was done in the allocation of bridge costs in recent Oregon studies.

All other approaches to capital-cost allocation are theoretically arbitrary and thus inherently second best. However, other approaches may be selected because of their convenience, despite the lack of a compelling underlying logic. One such

second-best approach to allocating capacity-enhancing capital costs was used in the three most recent Oregon studies. The non-wear-related portion of capital costs were allocated in proportion to passenger-car-equivalent vehicle-miles traveled during the peak hour (peak PCE-VMT), which varies in proportion to each vehicle's contribution to congestion on existing facilities, but does not take into account the relationship between volume and capacity on existing facilities. The approach also assumes that the value of time is equal across all vehicle types, trip types, and vehicle occupancies.

If the benefits resulting from a given expenditure vary with vehicle use, the cost may be allocated in proportion to the level of benefit. For example, if the occupants of every vehicle passing a safety improvement benefit from reduced risk of death or injury, the cost could be attributed on the basis of occupant-miles traveled or, if occupancy is assumed to be the same across all vehicles, vehicle-miles traveled. Other costs may not vary at all with vehicle use but must still be allocated to vehicles. If one allocates costs that do not vary with use, any allocator that seems "fair" may be chosen. In these cases, there is no single right allocator to use.

In general, an allocator that varies more closely with costs imposed should be selected over one that varies less closely. The degree of correlation may be measurable given sufficient data, but the necessary data usually do not exist, so one must calculate the expected relationship based on engineering and economic theory. A strong statistical correlation does not necessarily indicate a good allocator, as there is no reason to believe that an accidental correlation will persist. An allocator must also vary with measurable (and measured) attributes of vehicles, such as miles traveled, weight, length, number of axles, or some combination of those.

Allocators Used in this Study

As noted above, there are a number of cost allocators available for use in a cost allocation study. Allocators may be applied on either a per-vehicle or per-vehicle-mile-traveled basis. Because it is generally vehicle use, rather than the existence of vehicles, that imposes costs on the highway system, all costs in the current Oregon study are allocated using some type of weighted vehicle-miles traveled (VMT). Exhibit 3-1 shows the allocators applied to each expenditure category for this study.

Unweighted VMT are the most general measure of system use and are considered a fair way to assign many types of common costs, that is, costs considered to be the joint responsibility of all highway users. VMT represent a reasonable and accepted measure to assign costs among the members of a subgroup (e.g., the individual vehicle classes within a cost increment), especially when members of the subgroup have similar characteristics or when an investment is made to provide a safer highway facility. Unweighted VMT are used for many traffic-oriented services, such as the provision of lighting, signs, and traffic signals, since these services are generally related to traffic volumes.

Weighting VMT with an appropriate vector of zeros and ones will produce an allocator that restricts the allocation to a corresponding subset of weight classes. Such allocators are used to implement the incremental approach for bridge costs and for other costs allocated on VMT for a subset of all vehicles. One example is the allocation of Motor Carrier Transportation Division administrative costs only to vehicles over 26,000 pounds.

Other VMT weighting factors may also be used to allocate certain costs more appropriately. VMT can be weighted to account for the effective roadway space occupied by various types of vehicles relative to a standard passenger car. This is accomplished by using passenger-car equivalence (PCE) factors to weight VMT, producing PCE-VMT. Because trucks are

Exhibit 3-1: Allocators Applied to Each Expenditure Category

Work Type	Work Type Description	Allocator 1	Share 1	Allocator 2	Share 2
1	Preliminary and Construction Engineering (and etc.)	Congested PCE	55.9%	Other Construction	44.1%
2	Right of Way (and Utilities)	Congested PCE	73.8%	Other Construction	26.2%
3	Grading and Drainage	Congested PCE	100.0%		0.0%
4	New Pavements-Rigid	Congested PCE	4.0%	Rigid Pave	96.0%
5	New Pavements-Flexible	Congested PCE	5.4%	Flex Pave	94.6%
6	New Shoulders-Rigid	Congested PCE	100.0%		0.0%
7	New Shoulders-Flexible	Congested PCE	100.0%		0.0%
8	Pavement and Shoulder Reconstruction-Rigid	Congested PCE	4.0%	Rigid Pave	96.0%
9	Pavement and Shoulder Reconstruction-Flexible	Congested PCE	5.4%	Flex Pave	94.6%
10	Pavement and Shoulder Rehab-Rigid	All VMT	4.0%	Rigid Pave	96.0%
11	Pavement and Shoulder Rehab-Flexible	All VMT	5.4%	Flex Pave	94.6%
12	Pavement and Shoulder Rehab-Other	All VMT	100.0%		0.0%
13	New Structures	None-Bridge Split	100.0%		0.0%
14	Replacement Structures	None-Bridge Split	100.0%		0.0%
15	Structures Rehabilitation	None-Bridge Split	100.0%		0.0%
16	Climbing Lanes	Uphill PCE	100.0%		0.0%
17	Truck Weight/Inspection Facilities	Over 26 VMT	100.0%		0.0%
18	Truck Escape Ramps	Over 26 VMT	100.0%		0.0%
19	Interchanges	None-Bridge Split	100.0%		0.0%
20	Roadside Improvements	All VMT	100.0%		0.0%
21	Safety Improvements	Congested PCE	100.0%		0.0%
22	Traffic Service Improvements	Congested PCE	100.0%		0.0%
23	Other Construction (modernization)	Other Construction	100.0%		0.0%
24	Other Construction (preservation)	All VMT	100.0%		0.0%
25	Surface and Shoulder Maintenance-Rigid	All VMT	4.0%	Rigid Pave	96.0%
26	Surface and Shoulder Maintenance-Flexible	All VMT	5.4%	Flex Pave	94.6%
27	Surface and Shoulder Maintenance-Other	All AMT	100.0%		0.0%
28	Drainage Facilities Maintenance	All VMT	100.0%		0.0%
29	Structures Maintenance	All VMT	100.0%		0.0%
30	Roadside Items Maintenance	All VMT	100.0%		0.0%
31	Safety Items Maintenance	All VMT	100.0%		0.0%
32	Traffic Service Items Maintenance	Congested PCE	100.0%		0.0%
33	Pavement Striping and Marking (maintenance)	All AMT	100.0%		0.0%
34	Sanding and Snow and Ice Removal (maintenance)	All VMT	100.0%		0.0%
35	Extraordinary Maintenance	All VMT	100.0%		0.0%
36	Truck Scale Maintenance-Flexible	Over 26 VMT	100.0%		0.0%
37	Truck Scale Maintenance-Rigid	Over 26 VMT	100.0%		0.0%
38	Truck Scale Maintenance-Buildings and Grounds	Over 26 VMT	100.0%		0.0%
39	Studded Tire Damage	Basic VMT	100.0%		0.0%
40	Miscellaneous Maintenance	All VMT	100.0%		0.0%
41	Bike/Pedestrian Projects	All VMT	100.0%		0.0%
42	Railroad Safety Projects	All VMT	100.0%		0.0%
43	Transit and Rail Support Projects	Congested PCE	100.0%		0.0%
44	Fish and Wildlife Enabling Projects	All VMT	100.0%		0.0%

Exhibit 3-1: Allocators Applied to Each Expenditure Category

Work Type	Work Type Description	Allocator 1	Share 1	Allocator 2	Share 2
45	Highway Planning	All VMT	100.0%		0.0%
46	Transportation Demand & Transportation System Management	Congested PCE	100.0%		0.0%
47	Multimodal	Congested PCE	100.0%		0.0%
48	Reserve Money, Fund Exchange, Immediate Opportunity Fund	All VMT	100.0%		0.0%
49	Seismic Retrofits on Structures	All VMT	100.0%		0.0%
50	Other Common Costs	All VMT	100.0%		0.0%
55	Other--Over 26,000 Only	Over 26 VMT	100.0%		0.0%
56	Other--Basic Only	Basic VMT	100.0%		0.0%
57	Other--Over 8,000 Only	Over 10 VMT	100.0%		0.0%
58	Other--Under 26,000 Only	Under 26 VMT	100.0%		0.0%
59	Other Administration	All VMT	100.0%		0.0%
60	Bridge --All Vehicles Share (no added capacity)	All VMT	100.0%		0.0%
61	Bridge --Over 10,000 Vehicles Share	Over 10 VMT	100.0%		0.0%
62	Bridge --Over 50,000 Vehicles Share	Over 50 VMT	100.0%		0.0%
63	Bridge --Over 80,000 Vehicles Share	Over 80 VMT	100.0%		0.0%
64	Bridge --Over 106,000 Vehicle Share	Over 106 VMT	100.0%		0.0%
65	Bridge --All Vehicles Share (added capacity)	Congested PCE	100.0%		0.0%
66	Other Bridge	Other Bridge	100.0%		0.0%
67	Interchange Modernization	None-Bridge Split	100.0%		0.0%
68	Bridge Replacement with Capacity	None-Bridge Split	100.0%		0.0%

larger and heavier than cars and require greater acceleration and braking distances, they occupy more effective roadway space and therefore have higher PCE factors.

A variety of PCE factors were developed for the 1997 federal study, including different factors for different functional classes and different levels of traffic congestion, as well as uphill factors for steep grades. The uphill factors are used in this study to allocate the costs of climbing lanes.

Congested (or peak period) PCE-VMT is peak-period VMT weighted by the PCE factors for congested traffic conditions. It is used in this study for the common cost portion of projects undertaken to add capacity to the highway system.

VMT can also be weighted to reflect the amount of pavement wear imposed by vehicles of various weights and axle configurations. The factors used for this weighting are produced from the results of the pavement model described above.

Costs not accounted for as a part of specific construction projects but that are expected to vary with the overall level of construction are allocated with special factors developed during the allocation process. These factors allocate costs in proportion to the construction costs that were allocated from specific projects. Separate “other construction” factors are calculated and applied for work performed by the state and by local governments.

Prospective View

The costs or expenditures allocated in a cost allocation study can be those for a past period, those anticipated for a future period, or a combination of past and future costs. Some studies conducted by the federal government and other states have allocated both historical and planned expenditures.

The Oregon studies have traditionally used a prospective approach in which the

expenditures allocated are those planned for a future period, specifically, the next fiscal biennium. Similarly, the traffic data used in the studies is that projected for a future year. This is done to allow for changes in expenditure levels and traffic volumes, and so that the study results will be applicable for the period in which legislation is enacted to implement the study recommendations.

There are some disadvantages associated with allocating only projected future expenditures. Specifically, it requires relying on forecasts, which are subject to greater error than historical data.

The 1996 Cost Responsibility Blue Ribbon Committee recommended that the Oregon studies continue allocating only projected future expenditures. The current Oregon study again follows that recommendation, with the exception of incorporating study-period expenditures on the repayment of bonds issued in the prior study periods, allocated in the same proportions as in the prior studies.

Exclusion of External (Social) Costs

The Oregon studies, as well as the studies conducted by most other states, have chosen to allocate direct governmental expenditures and exclude external costs associated with highway use. The proponents of a cost-based approach argue that, to be consistent, a HCAS should include all costs that result from use of the highway system. They further argue that economically efficient pricing of highways requires the inclusion of all costs, and that failure to do so encourages an over-utilization of highways. Including external costs adds to the breadth and completeness of the analysis and helps determine appropriate user charges necessary to reflect these costs.

However, there are several disadvantages associated with including external costs. Although these costs represent real costs to society, they are decidedly more difficult to quantify and incorporate in the analysis than are direct highway costs. Inclusion of external costs therefore increases the data requirements and complexity of the studies, and could reduce their overall accuracy.

The 1996 Blue Ribbon Committee recommended that the Oregon studies continue to exclude social costs until the state implements explicit user charges to capture these costs. Both the 1982 and 1997 federal HCASs included some social costs in supplementary analyses. The 1999 Oregon Study recommended that future studies include "a separate assessment of the impacts of proposed changes in highway user taxes on the total costs of highway use including all major external costs." The 2001 and 2003 studies made this same recommendation.

In 2009, the State Legislature directed the Oregon Department of Administrative Services to prepare a second highway cost allocation based on the concept of the efficient pricing of highways, in addition to the traditional study. ORS 366.506 Section 30 in House Bill 2001 specifically required that an efficient fee study "consider the actual costs users impose on the highway system, including but not limited to highway replacement costs, traffic congestion costs and the cost of greenhouse gas emissions." Additionally, the efficient fee study report needed to "include recommendations for legislation to implement the efficient fee method of cost allocation." The results of the 2011 Oregon Efficient Fee Highway Cost Allocation Study were presented in a separate report.

Expenditure Allocation

The Oregon studies allocate expenditures of road-related user fees, rather than costs. Over the long run, expenditures must cover the full direct costs being imposed on the system or the system will deteriorate. Over any shorter period, however, expenditures will exceed or fall short of the costs imposed. Additionally, local governments spend money from sources other than user fees on local roads and bridges. Oregon's highway cost allocation process includes

the expenditure of the portion of local governments' own-source revenues that are fungible with state user fees, but excludes the expenditure of own-source funds that are dedicated to particular projects or purposes. In this study, 17.6 percent of local government expenditures (6.5 percent of all expenditures) were excluded.

Some past Oregon studies, including a special analysis in the 2001 Study, attempted to estimate and allocate a full-cost budget in addition to a base-level (actual expenditure) budget. The intent was to approximate costs by estimating the level of expenditures required to preserve service levels and pavement conditions at existing levels. In these studies heavy vehicles were found to be responsible for a greater share of the preservation level budget than of the base-level budget. This was because the majority of unmet needs at that time involved pavement rehabilitation and maintenance, items for which heavy vehicles have the predominant responsibility.

There are strong arguments for moving toward a full cost-based approach in highway cost allocation studies. Recognizing the benefit of moving toward a financing system based on efficient fees, a full 2011 Efficient Fee Highway Cost Allocation Study was performed in addition to the traditional study. "True" costs are still more difficult to quantify and incorporate in the analysis than are direct highway expenditures. Some of these problems are theoretical in nature or are limited by our knowledge of such costs, and data limitations also plague the calculation of many of these costs. As a practical matter, therefore, highway cost allocation studies, including this study, continue to focus on the allocation of expenditures rather than costs.

Treatment of Debt-Financed Expenditures and Debt Service

Oregon has traditionally relied much less on debt financing of its highway program than have many other states. This has changed since the enactment of the Oregon Transportation Investment Act (OTIA) by the 2001 Legislature. The first OTIA authorized the issuance of $400 million in new debt for projects to be completed across Oregon. It provided $200 million for projects that add lane capacity or improve interchanges and $200 million for bridge and pavement rehabilitation projects. Automobile and truck title fees were increased to finance the repayment of construction bonds for OTIA projects.

Favorable bond-rate conditions allowed the 2002 Special Legislative Session to authorize an additional $100 million in debt without needing to further increase revenues. The original OTIA projects became known as OTIA I and the additional projects as OTIA II.

The 2003 Legislature authorized an additional $2.46 billion in new debt and increased title, registration, and other DMV fees to produce the additional revenue necessary to repay the bonds. The OTIA III money was to be spent as follows:

- $1.3 billion to repair or replace 365 state bridges
- $300 million to repair or replace 141 locally owned bridges
- $361 million for local-government maintenance and preservation
- $500 million for modernization

The issue of how to treat OTIA project expenditures and the associated debt service was discussed at some length by the Study Review Teams for both the 2003 and 2005 studies. Debt finance introduces a disconnect between study-period revenues and expenditures because the time period in which the revenues are received differs from the period in which the funds are expended. Care needs to be taken to avoid double counting, which would occur if both the debt-financed project expenditures and full debt service expenditures (including interest and repayment of principal) were included.

While not all of the funds expended on OTIA projects come from bonds, the bonded amounts are easily identifiable, as are the

associated debt service expenses. The dollar amount allocated in the model is the study-period debt service expenditure, given the bond rate and amortization period, in this case 20 years. The expenditures associated with each bond-financed project are scaled down by a bond factor to one study period's worth of debt service expenditure before allocation. This method retains the project detail necessary to assign expenditure shares by vehicle class. The dollar amounts allocated to each vehicle class for bonded projects are recorded and carried forward to each of the next nine studies.

This approach has two disadvantages: the choice of which projects get bond financing can affect the results of the study, as well as the next nine studies, and the allocation of those expenditures in future studies remains based on traffic conditions expected for the first two years of the 20-year repayment period. The Study Review Team considered a number of alternative approaches and decided that the advantages of simplicity and limited data requirements for the chosen approach outweighed its disadvantages. They also noted that the failure to update the allocation in future studies was consistent with the treatment of cash-financed projects, which are completely ignored in all future studies.

Treatment of Alternative-Fee-Paying Vehicles

Under Oregon's existing highway taxation structure, some types of vehicles are exempt from certain fees or qualify to pay according to alternative-fee schedules. These types of vehicles are collectively referred to in this report as "alternative-fee-paying" vehicles. The two main types of such vehicles are publicly owned vehicles and farm trucks. Publicly owned vehicles pay a nominal registration fee and are not subject to the weight-mile tax. Most types of publicly owned vehicles are now subject to the state fuel tax, but many diesel-powered publicly owned vehicles are not. Operators of farm trucks pay lower annual registration fees than operators of regular commercial trucks, and most pay fuel taxes, rather than weight-mile taxes when operated on public roads.

The reduced rates paid by certain types of vehicles mean they are paying less per mile than comparable vehicles subject to full fees. The difference between what alternative-fee-paying vehicles are projected to pay and what they would pay if they were subject to full fees is the *alternative-fee difference*. The approach used in past Oregon studies is to calculate this difference for each weight class and sum these amounts. The total alternative-fee difference (subsidy amount) was then reassigned to all other, full-fee-paying vehicles on a per-VMT basis, that is, this amount was treated as a common cost to be shared proportionately by all full-fee-paying vehicles.

The rationale for this approach was that the granting of these reduced fees represents a public policy decision, and most vehicles paying reduced fees are providing some public service that arguably should be paid for by all taxpayers in relation to their use of the system. Because the heavy vehicle share of the total alternative-fee difference is greater than their share of total statewide travel, reassigning this amount on the basis of relative vehicle miles had the effect of increasing the light vehicle responsibility share and reducing the heavy vehicle share.

For the current study, the Study Review Team recommended that the alternative-fee difference be reported, but that the final results be calculated for full-fee paying vehicles only, without any adjustment related to alternative-fee paying vehicles. In Chapter 6 of this report, we describe what the results would have been had the prior method been used.

Treatment of Tax Avoidance and Evasion

When vehicles subject to Oregon's fuel tax purchase fuel in another state and then drive in Oregon, they avoid the Oregon fuel tax. The reverse is also true, so if the number of miles driven in Oregon on out-of-state fuel equaled the number of miles driven outside Oregon on in-state fuel, the net avoidance would be zero. Net avoidance in Oregon is significant because of the large number of people who live in Washington and work in Oregon. These people tend to buy a smaller proportion of their fuel in Oregon than the proportion of their total miles that are driven in Oregon. This net avoidance is specifically accounted for in the highway cost allocation study by assuming that 3.5 percent of VMT by fuel-tax paying vehicles do not result in fuel-tax collections for Oregon.

The International Fuel Tax Agreement sorts out the payments of state fuel taxes and the use of fuel in other states for interstate truckers. If truckers pay fuel tax in California, for example, and then use that fuel in Oregon while paying the weight-mile tax, IFTA provides a mechanism for California to reimburse them. If truckers then buy fuel in Oregon, paying no fuel tax, and drive in Washington, IFTA provides a mechanism for them to pay what they owe to Washington.

The avoidance of the weight-mile tax by vehicles that are not legally required to pay it is treated as described above, under alternative-fee paying vehicles, rather than as avoidance.

Virtually any tax is subject to some evasion. While it is generally agreed that evasion of the state gasoline tax and vehicle registration fees is quite low, there is more debate concerning evasion of the weight-mile and use fuel (primarily diesel) taxes. For the purpose of this study, it was assumed that evasion of the weight-mile tax is equal to 5 percent of what would be collected if all that is due were paid. This is the midpoint of the 3 to 7 percent evasion rate estimated by the Oregon Weight-Mile Tax Study conducted by consultants for the Legislative Revenue Office in 1996. This study also assumes that an additional 1.0 percent of the use-fuel tax on diesel (beyond the 3.5 percent avoidance) is successfully evaded.

Chapter 4

Study Data and Forecasts

Five major types of data are required to conduct a highway cost allocation study. These are:

- **Traffic data.** The miles of travel by vehicle weight and type on each of the road systems used in the study.
- **Expenditure data.** Projected expenditures on construction projects by work type category, road system, and funding source, and projected expenditures in other categories by funding source.
- **Revenue data.** Projected revenues by revenue source or tax instrument.
- **Allocation factors.** Factors used to allocate costs to individual vehicle classes, including passenger-car equivalence (PCE) factors, pavement factors, and bridge increment shares.
- **Conversion factors and distributions.** Examples include distributions used to convert VMT by declared weight class to VMT by operating weight class or to VMT by registered weight class.

The allocation factors used in this study are described in Chapter 3 and the development and use of conversion factors is described in Appendix E, Technical Documentation.

The remainder of this chapter presents the traffic, expenditure, and revenue data used in the 2013 Study and compares them with the data used in the previous Oregon studies.

Traffic Data and Forecasts

VMT by road system, by vehicle weight class and number of axles, and by vehicle tax class are important throughout the cost allocation and revenue attribution processes. VMT estimates and projections are used in both the allocation of expenditures and the attribution of revenues to detailed vehicle classes. Additionally, as explained in Chapter 3, VMT weighted by factors such as PCEs or pavement factors is used to assign several of the individual expenditure categories allocated in the study.

For this study, the required traffic data were first collected for the 2011 base year, the latest year for which complete historical data were available. These data were then projected forward to calendar year 2014, the middle 12 months of the 2013-15 fiscal biennium, which is the study period.

The base year traffic data were obtained from a number of sources. These include ODOT Motor Carrier Transportation Division (MCTD) weight-mile tax information, ODOT traffic counts and traffic classification statistics, Highway Performance Monitoring System (HPMS) submittals, MCTD and Driver & Motor Vehicle Services vehicle registrations data, and the Weigh-In-Motion data and Special Truck Weighings previously discussed. For each road system used in the study, travel estimates are developed for light vehicles and each 2,000-pound truck weight class.

Information from state economic forecasts and from ODOT's revenue forecasting model is used to forecast projected study year traffic from the base year data. Data from Weigh-In-Motion and Special Truck Weighings are used to convert truck miles of travel by declared weight class to miles of travel by operating weight class and to obtain detailed information on vehicle configurations and axle counts for each weight class. HPMS data are used to spread VMT to functional classifications.

Exhibit 4-1 shows that total vehicle travel in Oregon is projected to increase from 36.2 billion miles in 2011 to 39.0 billion miles in 2014. This represents an average annual growth of about 2.5 percent. Light vehicle travel is projected to increase from 33.6 billion miles in 2011 to 36.1 billion miles in 2014, which represents an average annual growth of 2.5 percent. Total heavy vehicle travel is forecast to increase from 2.56 billion miles in 2011 to 2.85 billion miles in 2014, an average annual growth of about 3.6 percent. These projections are based on, and consistent with, the projections from ODOT's revenue forecast model. The traffic growth projections for the current study are higher than those for the 1999, 2001, 2003, 2005, 2007, 2009, and 2011 studies. The 1999 Study projected that total state VMT would grow at an average annual rate of 1.7 percent between 1997 and 2000. The 2001 Study projected 1.3 percent annual growth between 1999 and 2002. The 2003 Study projected 1.1 percent annual growth between 2001 and 2004. The 2005 Study growth projection of 1.6 percent reflected recovery from the economic downturn in Oregon and the nation that limited growth in the early part of the decade. The 2007 Study projected a 1.9 percent annual growth rate between 2005 and 2008, reflecting the upward trend in the economy during that period. The 2009 Study projected a growth rate of 1.1 percent from 2007 to 2010, reflecting the recession of 2008 through 2009, with a particularly high negative growth rate for heavy vehicles over the study VMT period. The 2011 Study projected a growth rate of 1.9 percent from 2009 to 2012, reflecting some of the expected recovery from the recent recession. The current study projects a

Exhibit 4-1: Current and Forecasted VMT by Weight Group (millions of miles)

Declared Weight in Pounds			2011 VMT (estimate)	2014 VMT (forecast)	Average Annual Growth Rate
1	to	10,000	33,592	36,123	2.5%
10,001	to	26,000	659	722	3.1%
26,001	to	78,000	407	450	3.4%
78,001	to	80,000	1,034	1,174	4.3%
80,001	to	104,000	229	260	4.3%
104,001	to	105,500	230	237	0.9%
105,501	and	up	4	4	3.7%
Total for All Vehicles			36,156	38,969	2.5%
Total for Vehicles Under 10,001 pounds			33,592	36,123	2.5%
% for Vehicles Under 10,001 pounds			92.9%	92.7%	
Total for Vehicles Over 10,000 pounds			2,563	2,846	3.6%
% for Vehicles Over 10,000 pounds			7.1%	7.3%	
Total for Vehicles Under 26,001 pounds			34,252	36,845	2.5%
% for Vehicles Under 26,001 pounds			94.7%	94.5%	
Total for Vehicles Over 26,000 pounds			1,904	2,124	3.7%
% for Vehicles Over 26,000 pounds			5.3%	5.5%	

growth rate of 2.5 percent from 2011 to 2014, reflecting continued recovery from the recession. While these traffic projections are based on accepted practices and the best available data, VMT has, in recent years, become more difficult to forecast accurately. Possible explanations include changes in the distribution of ages in the population, differences in preferences for travel modes between age cohorts, changes in commuting patterns, and telecommuting.

Forecasted heavy vehicle travel is expected to grow slightly faster than forecasted light vehicle travel between 2011 and 2014. The share of travel accounted for by light vehicles is not expected to change by a large amount between 2011 and 2014 (forecasts are 92.9 percent in 2011 and 92.7 percent in 2014).

Exhibit 4-1 also shows that the growth projected for heavy vehicle travel varies by weight group. The lowest growth among the heavy vehicle weight classes, 0.9 percent, is expected to be in the 104,001 to 105,500 pound weight class group. The 78,001 to 80,000 and 80,001 to 104,000 pound groups are expected to experience the fastest growth, 4.3 percent, from 2011 to 2014.

Exhibit 4-2 shows the distribution of projected 2014 travel between light and heavy vehicles for different combinations of road system and ownership. Although light vehicles are projected to account for 92.7 percent and heavy vehicles 7.3 percent of total statewide VMT, the mix of traffic varies significantly among the different road systems. Heavy vehicles are projected to account for 17.9 percent of the travel on rural interstate highways but only 3.1 percent of the travel on city streets. Heavy vehicles are expected to account for 9.5 percent of the overall travel on state highways and 3.9 percent of the travel on local roads.

Exhibit 4-3 illustrates, in a slightly different manner, how the relative mix of traffic varies by road system. It presents the separate distributions of projected VMT by road system for light vehicles, heavy vehicles, and all vehicles. As shown, 61.0 percent of total travel in the state is expected to be on state highways and 38.8 percent on local roads and streets. These shares, however, differ significantly for light versus heavy vehicles. Rural interstate highways, for example, are projected to handle 12.4 percent of total travel in 2014 but 30.4 percent of heavy

Exhibit 4-2: Projected 2014 VMT by Road System (millions of miles)

	Light Vehicles		Heavy Vehicles		
Road System	Miles of Travel	Percent of Total	Miles of Travel	Percent of Total	Total VMT
Interstate Urban	5,060	91.9%	448	8.1%	5,509
Interstate Rural	3,961	82.1%	866	17.9%	4,827
Other State Urban	5,597	95.9%	238	4.1%	5,835
Other State Rural	6,909	90.9%	696	9.1%	7,604
Subtotal-State Roads	21,527	90.5%	2,247	9.5%	23,774
County Roads	7,151	95.3%	355	4.7%	7,506
City Streets	7,378	96.9%	240	3.1%	7,618
Subtotal-Local Roads	14,529	96.1%	595	3.9%	15,124
Subtotal-State and Local Roads	36,056	92.7%	2,842	7.3%	38,898
Federal Roads	83	94.8%	5	5.2%	87
Total-All Roads	36,138	92.7%	2,847	7.3%	38,985

Exhibit 4-3: Distribution of Projected 2014 VMT by Road System

Road System	Percent of Light Vehicle Total	Percent of Heavy Vehicle Total	Percent of All Vehicle Total
Interstate Urban	14.0%	15.7%	14.1%
Interstate Rural	11.0%	30.4%	12.4%
Other State Urban	15.5%	8.4%	15.0%
Other State Rural	19.1%	24.4%	19.5%
Subtotal State Systems	59.6%	79.0%	61.0%
County Roads	19.8%	12.5%	19.3%
City Streets	20.4%	8.4%	19.5%
Subtotal Local Systems	40.2%	20.9%	38.8%
Federal Roads	0.2%	0.2%	0.2%
Total All Systems	100.0%	100.0%	100.0%

vehicle travel. At the other extreme, 20.4 percent of light vehicle travel, but only 8.4 percent of heavy vehicle travel, is forecast to be on city streets. State highways are expected to handle about 59.6 percent of total travel by light vehicles and 79.0 percent of travel by heavy vehicles.

Exhibit 4-4 compares the VMT projections by road system used in the 1999, 2001, 2003, 2005, 2007, 2009, 2011, and 2013 studies. It shows a steady decline in VMT on rural road systems and a corresponding increase in VMT on urban roads. The systems projected to account for the largest shares of total statewide travel are Other State Rural highways, County Roads, and City Streets. The current study projects a higher share of travel on interstate urban highways than did prior studies.

Expenditure Data

Until the 2001 Study, Oregon highway cost allocation studies allocated only expenditures of Oregon highway user fees by state and local-government agencies. Because federal funds are in many cases

Exhibit 4-4: Comparison of Forecast VMT Used in OR HCASs: 1999, 2001, 2003, 2005, 2007, 2009, 2011, and 2013 (billions of miles)

Road System	1999 Study		2001 Study		2003 Study		2005 Study		2007 Study		2009 Study		2011 Study		2013 Study	
	2000 VMT	% of Total	2002 VMT	% of Total	2004 VMT	% of Total	2006 VMT	% of Total	2008 VMT	% of Total	2010 VMT	% of Total	2012 VMT	% of Total	2014 VMT	% of Total
Interstate Urban	4.0	11.8%	3.9	11.4%	3.9	11.2%	4.1	11.3%	5.0	12.9%	5.1	13.2%	5.0	13.2%	5.5	14.2%
Interstate Rural	4.4	12.9%	4.4	12.7%	4.4	12.6%	4.7	13.0%	4.8	12.4%	4.8	12.6%	4.8	12.7%	4.8	12.4%
Other State Urban	4.5	13.2%	5.5	15.7%	5.2	15.1%	5.3	14.7%	6.1	15.7%	6.1	15.9%	5.7	15.1%	5.8	15.0%
Other State Rural	7.5	22.1%	7.8	22.5%	7.5	21.6%	8.0	22.1%	7.7	19.8%	7.7	19.9%	7.8	20.6%	7.6	19.5%
Subtotal State Systems	20.4	60.0%	21.7	62.3%	21.0	60.5%	22.1	61.1%	23.6	60.8%	23.7	61.6%	23.4	61.7%	23.8	61.1%
County Roads	8.6	25.3%	8.0	22.9%	8.9	25.6%	7.9	22.0%	8.3	21.3%	7.4	19.3%	7.0	18.4%	7.5	19.3%
City Streets	5.0	14.7%	5.1	14.8%	4.8	13.9%	6.1	17.0%	6.9	17.9%	7.3	19.0%	7.6	19.9%	7.6	19.6%
Subtotal Local Systems	13.6	40.0%	13.1	37.7%	13.7	39.5%	14.1	38.9%	15.2	39.2%	14.7	38.4%	14.6	38.3%	15.1	38.9%
Total	34.0	100.0%	34.8	100.0%	34.7	100.0%	36.2	100.0%	38.8	100.0%	38.4	100.0%	38.0	100.0%	38.9	100.0%

interchangeable with state funds, and because the proportion of federal funds used for any particular project is arbitrary and subject to change between the time of the study and the time the money is spent, excluding federal funds can introduce arbitrary bias and inaccuracy into the study results. The 2001 Study included the expenditure of federal funds by the state and reported their allocation both separately and in combination with state funds.

The 2003 Study, for the first time ever, included all expenditures on roads and streets in the state. In addition to state-funded expenditures, expenditures (both state and local) funded from federal highway revenues and locally generated revenues were also included. This change substantially increased the level and breadth of expenditures allocated in the 2003 Study as compared to previous studies.

Since 2005, Oregon highway cost allocation studies have included expenditures of state, federal, and local revenues but exclude certain categories of local revenues determined to not be interchangeable with state user fees. Those sources are locally issued bonds, property taxes (including local improvement districts), systems development charges, and traffic impact fees.

The expenditure data for this study were obtained from a number of sources. Data from ODOT's monthly Budget and Cash Flow Forecast were used to develop projected construction expenditures by project for the 2013-15 biennium. Projected expenditures on maintenance and other programs were obtained from ODOT Financial Services and based on ODOT's Agency Request Budget.

Identifying those expenditures projected to be federally funded was relatively straightforward, and based on detailed information from the ODOT Cash Flow Forecast model and Project Control System. Local expenditures were projected from data obtained from the 2011 Local Roads and Streets Survey combined with information from ODOT's Agency Request Budget.

Exhibit 4-5 presents the average annual expenditures projected for the 2013-15 biennium by major category (modernization, preservation, maintenance, bridge, and other) and funding source (state, federal, bond, and local). As shown, projected expenditures total $1.6 billion. This compares to annual expenditures allocated in the 1999, 2001, 2003, 2005, 2007, 2009, and 2011 studies of $691 million, $649 million, $1.5 billion, $1.5 billion, $1.7 billion, $1.8 billion, and $1.5 billion, respectively. These totals do not include the expenditure of bond revenues.

Of the $1.6 billion total annual expenditures, $925 million (58.3 percent) are projected to be state funded, $537 million (33.9 percent) federally funded, and $101 million (6.4 percent) locally funded. The remaining $23 million (1.4 percent) of allocated expenditures are the allocated portion of the $142 million per year of

Exhibit 4-5: Average Annual Expenditures by Category and Funding Source (thousands of dollars)

Major Expenditure Category	State Funds	Percent of All Sources	Federal Funds	Percent of All Sources	Local Funds	Percent of All Sources	Bond Funds	Percent of All Sources	All Funding Sources
Modernization	99,240	37.6%	143,262	54.3%	15,675	5.9%	5,461	2.1%	263,637
Preservation	43,026	36.0%	63,973	53.5%	12,461	10.4%	133	0.1%	119,593
Maintenance	335,304	70.3%	105,099	22.0%	36,353	7.6%	168	0.0%	476,924
Bridge	12,045	14.6%	57,738	69.9%	516	0.6%	12,286	14.9%	82,585
Other	435,520	67.7%	166,723	25.9%	36,013	5.6%	4,695	0.7%	642,951
All Expenditures	925,136	58.3%	536,794	33.9%	101,018	6.4%	22,743	1.4%	1,585,690

expended bond revenue. An additional $173 million per year of pre-allocated bond expenditures from prior studies is included in the allocated costs in this study.

The local funds column of Exhibit 4-5 includes only local expenditures from the own-source revenues that were included in this study. Local expenditures from state and federal revenues are included in the state funds and federal funds columns, respectively.

Bridge and interchange expenditures are shown separately from other modernization, preservation, and maintenance expenditures.

The "other" category in the exhibit encompasses expenditures for a large number of different activities. In addition to general administrative and tax collection costs for the state, counties, and cities, it includes expenditures for:

- Preliminary engineering
- Right of way acquisition and property management
- Safety-related projects, safety inspections, and rehabilitation and maintenance of existing safety improvements
- Pedestrian/bike projects
- Railroad safety projects
- Fish- and wildlife-enabling projects (e.g., salmon culverts)
- Transportation demand management and transportation system management projects (e.g., Traffic Operations Centers)
- Multi-modal projects
- Transportation project development and delivery
- Transportation planning, research, and analysis

The exhibit shows significant differences in the funding of different expenditure categories. Modernization, preservation, and bridge expenditures, in particular, have large federal funds components. About 54 percent of modernization, 54 percent of preservation, and 70 percent of bridge expenditures will be federally funded. Maintenance expenditures, on the other hand, are largely state, and to a lesser extent, locally funded, with a small federal funds component. About 54 percent of the OTIA and JTA bond expenditures in the study period will be on state- and locally-owned bridges. Modernization expenditures make up an additional 24 percent of OTIA and JTA bond expenditures. An additional 21 percent of bond expenditures fall into the "other" category. Most of those are for administration, engineering, and right-of-way expenditures associated with state- and locally-owned bridges.

Revenue Data and Forecasts

The revenues projected for this study include receipts from taxes and fees collected by the state from highway users, that is, revenues flowing into Oregon's dedicated State Highway Fund. Revenues from federal taxes and user fees are not estimated. Similarly, revenues generated by local governments from their own funding sources (e.g., property taxes, street assessments, system development charges, local fuel taxes) are not included. Because the expenditure of federal and local revenues are included among the expenditures to be allocated, and because a portion of the expenditure of bond revenue in the prior biennium is included, average annual allocated expenditures exceed average annual attributed revenues by $663.1 million.

The revenue data required for the study are obtained directly from ODOT's revenue forecasting model. The revenue forecast used for the present study was the December 2011 forecast; the latest available at the time the study was being conducted. The forecasts include the approximately 40 percent of State Highway Fund revenues transferred to local governments for use on local roads and streets, and all state funds used for highways, including matching

requirements for federal-aid highway projects.

Average annual state revenues for the 2013-15 biennium are expected to total $1.1 billion. As shown in Exhibit 4-6, fuel taxes and the weight-mile tax are the two largest sources of state user-fee revenue. Revenue from the state fuel tax is projected to average $515 million per year (47.0 percent of total revenues) and weight-mile tax revenue is forecast to average $277 million (25.2 percent of total revenues). These two sources account for 72.2 percent of highway user revenues, illustrating that Oregon's system of highway finance is based heavily on taxes and fees directly related to use of the system.

Revenue from registration and title fees is anticipated to average $296 million annually (27.0 percent of total revenues), relatively consistent with the 2005, 2007, 2009, and 2011 studies, but up sharply from prior studies as a result of registration fee increases. Other revenue sources bring in smaller amounts of revenue.

Exhibit 4-7 compares the forecasts of average annual total revenues used in the 1999, 2001, 2003, 2005, 2007, 2009, 2011, and 2013 studies. The total revenues forecast for the current study are $1.1 billion. The increase between the 2009 and 2011 studies reflects the increases in the fuel tax, weight-mile tax, and registration fees enacted as part of the 2009 Jobs and Transportation Act.

Caution should be used in comparing these forecasts, however, because they were made at different times for different biennia, and they used somewhat different assumptions regarding the treatment of ODOT beginning and ending balances. Additionally, title fees were not identified as a revenue source in studies prior to 2003 because they did not produce net revenue.

Exhibit 4-6: Revenue Forecasts by Tax/Fee Type (thousands of dollars), Average Annual Amounts for 2013-15 Biennium

Tax/Fee	Forecast Revenue	Percent of Total
Fuel Tax	515,082	47.0%
Weight-Mile Tax	276,522	25.2%
Registration Fees	226,201	20.6%
Title Fees	69,504	6.3%
Other Motor Carrier Revenue	5,538	0.5%
Road Use Assessment Fees	2,959	0.3%
Total	1,095,805	100.0%

Exhibit 4-7: Comparison of Forecast Revenue (millions of dollars) Used in OR HCASs: 1999, 2001, 2003, 2005, 2007, 2009, 2011, and 2013

Year of Study	Average Annual Forecast Revenue
1999	691.1
2001	690.0
2003	712.8
2005	825.5
2007	878.8
2009	869.7
2011	1,126.2
2013	1,095.8

Chapter 5

Expenditure Allocation and Revenue Attribution Results

This chapter presents the expenditure allocation and revenue attribution results of the 2013 Study and compares them to the results of previous Oregon studies. The following chapter reports equity ratios for each vehicle group and weight class based on the expenditure allocation and revenue attribution results.

Expenditure Allocation Results

The 2003 Study was the first to base expenditure allocation results on all highway expenditures, or those financed by federal, local, and state revenues. This approach was considered necessary to address the impacts of the federal advance construction program on expenditures. This change in approach meant the expenditure allocation results for the 2003 Study were not directly comparable to those of the earlier Oregon studies.

For the 2005, 2007, 2009, and 2011 studies, the approach used in the 2003 Study was modified to exclude the expenditure of certain local-government own-source revenues that were not considered to be interchangeable with State Highway Fund monies. The excluded categories were property taxes (including local improvement districts), bond revenues, systems development charges, and traffic impact fees. The 2013 Study uses the same methodology as the 2005, 2007, 2009, and 2011 studies. As a result, the expenditure allocations in this study are comparable to the 2005, 2007, 2009, and 2011 studies, but not directly comparable to those in the 2003 or earlier studies.

Exhibit 5-1 presents the expenditure allocation results by major expenditure category and vehicle weight group. Light (up to 10,000 pound) and heavy (over 10,000 pound) vehicles are projected to be responsible for 64.5 percent and 35.5 percent (respectively) of average annual total expenditures for the 2013-15 biennium.

As shown in the exhibit, the responsibility shares vary significantly among the major expenditure categories. Heavy vehicles, as a group, are projected to be responsible for the majority of preservation expenditures (63.5 percent). The group is responsible for smaller shares of modernization, maintenance, bridge, and other expenditures (38.4 percent, 47.4 percent, 34.0 percent, and 16.9 percent, respectively); this illustrates the point made previously that the mix of expenditures allocated can have a significant impact on the overall results.

Both the state and local governments spend funds from state user fees and from the federal government. Exhibit 5-2 shows the funds received from each revenue source and by whom they are expended. The difference between the funds received and the expenditures allocated is due to the allocation of bond expenditures. The upper part of the table shows the full expenditure of bond revenues and the lower part shows the portions of current and prior expenditures of bond revenues that are allocated to vehicles in this study. In the

Exhibit 5-1: Average Annual Cost Responsibility by Expenditure Category and Weight Class (thousands of dollars)

			All Funding Sources						
Declared Weight in Pounds			Modern-ization	Preser-vation	Mainte-nance	Bridge	Other	Prior Bonds	Total
1	to	10,000	162,363	43,616	251,061	54,483	534,046	89,401	1,134,970
10,001	to	26,000	10,578	9,277	28,938	5,144	12,355	8,353	74,643
26,001	to	78,000	9,419	9,356	27,658	3,312	18,511	7,955	76,210
78,001	to	80,000	50,286	32,277	97,697	10,288	53,602	32,120	276,271
80,001	to	104,000	14,254	10,741	31,134	2,745	12,256	16,918	88,049
104,001	to	105,500	15,255	12,697	36,107	2,484	11,693	18,143	96,379
105,501	and	up	1,483	1,629	4,329	4,130	488	373	12,431
Total			263,637	119,593	476,924	82,585	642,951	173,262	1,758,953
Total for Vehicles Under 10,001 Pounds			162,363	43,616	251,061	54,483	534,046	89,401	1,134,970
% for Vehicles Under 10,001 Pounds			61.6%	36.5%	52.6%	66.0%	83.1%	51.6%	64.5%
Total for Vehicles Over 10,000 Pounds			101,275	75,976	225,862	28,102	108,905	83,862	623,983
% for Vehicles Over 10,000 Pounds			38.4%	63.5%	47.4%	34.0%	16.9%	48.4%	35.5%
Total for Vehicles Under 26,001 Pounds			172,940	52,893	279,999	59,627	546,400	97,753	1,209,613
% for Vehicles Under 26,001 Pounds			65.6%	44.2%	58.7%	72.2%	85.0%	56.4%	68.8%
Total for Vehicles Over 26,000 Pounds			90,697	66,700	196,925	22,958	96,551	75,509	549,339
% for Vehicles Over 26,000 Pounds			34.4%	55.8%	41.3%	27.8%	15.0%	43.6%	31.2%

exhibits that follow, where allocated expenditures are broken down into state, federal, local, and bond, the categories correspond to rows in the lower part of Exhibit 5-2.

The responsibility amounts for state, federal, local, and bond expenditures are broken out separately in Exhibit 5-3. In this exhibit, the expenditure of state and federal monies by local governments are counted under the state and federal categories. The local category contains only the expenditure by local governments of their own revenues.

Light vehicles are projected to be responsible for 74.8 percent of state, 58.4 percent of federal, 59.6 percent of local, and 62.9 percent of bond expenditures. Heavy vehicles are projected to be responsible for 25.2 percent of state, 41.6 percent of federal, 40.4 percent of local, and 37.1 percent of bond expenditures. Overall, state-funded expenditures are expected to average $693.7 million annually over the 2013-15 biennium. Comparable annual

Exhibit 5-2: Sources and Expenditures of Funds (thousands of annual dollars)

	Source of Funds				
Expenditures of Funds	State Revenues	Bond Revenues	Federal Revenues	Local Revenues	All Sources
State Government	693,746	0	468,244	0	1,161,990
Local Governments	231,389	0	68,551	101,018	400,957
Expenditure of Bond Revenue	0	141,711	0	0	141,711
All Expenditures	925,136	141,711	536,794	101,018	1,704,659
Allocated State Expenditures	693,746	0	468,244	0	1,161,990
Allocated Local Expenditures	231,389	0	68,551	101,018	400,957
Allocated Current Bond	0	22,743	0	0	22,743
Allocated Prior Bond	0	173,262	0	0	173,262
Allocated Expenditures	925,136	196,005	536,794	101,018	1,758,953

Exhibit 5-3: Expenditure Allocation Results for Weight Groups by Funding Source (thousands of dollars)

		Allocation to Vehicles			
Funding Source	Average Annual Total Expenditures Allocated	Under 10,001 Pounds	Over 10,000 Pounds	Under 26,001 Pounds	Over 26,000 Pounds
State (Highway Fund)	693,746	519,004	174,742	536,513	157,234
		74.8%	25.2%	77.3%	22.7%
Federal	468,244	273,432	194,812	293,711	174,533
		58.4%	41.6%	62.7%	37.3%
Local	400,957	238,825	162,132	266,110	134,847
		59.6%	40.4%	66.4%	33.6%
Bond	22,743	14,308	8,434	15,527	7,216
		62.9%	37.1%	68.3%	31.7%
Current	1,585,690	1,045,569	540,121	1,111,860	473,830
		65.9%	34.1%	70.1%	29.9%
Prior Bond	173,262	89,401	83,862	97,753	75,509
		51.6%	48.4%	56.4%	43.6%
Total	1,758,953	1,134,970	623,983	1,209,613	549,339
		64.5%	35.5%	68.8%	31.2%

amounts for federal, local, and bond-funded expenditures are $468.2 million, $401.0 million, and $22.7 million, respectively.

The allocation results for state, federal, local, and bond expenditures are further broken out by major category in Exhibits 5-4 through 5-7.

Because of restrictions on the types of expenditures for which federal-aid highway funds can be used, federal funds tend to be concentrated on construction (i.e., modernization, preservation, and bridge) projects and other types of work for which heavy vehicles have the predominant responsibility. Additionally, federal funds are focused on projects on interstate and other higher order highways where the heavy vehicle share of travel is highest. Hence, the inclusion of federally funded expenditures in a state HCAS will almost always have the effect of reducing the light vehicle responsibility share and increasing the heavy vehicle share.

Conversely, state funds are generally more concentrated on maintenance, operations, administration, and other activities for which light vehicles have the largest responsibility share.

The inclusion of local expenditures in a state HCAS will, by itself, typically increase the relative responsibility of light vehicles and reduce that of heavy vehicles. This is because many types of expenditures are allocated on a relative travel basis and heavy vehicles account for a comparatively small share of the total travel on local roads and streets. This factor, however, is more than offset by the fact that local governments spend more of their road and street funds on activities having a comparatively high heavy vehicle responsibility component; specifically rehabilitation, repair, and maintenance of pavements and bridges.

Over the years, Oregon has shifted the funding of preservation activities toward federal funds, to the point where the adjustment for expenditures related to studded tire damage makes the amounts of state funds allocated to heavy vehicles for preservation negative. The negative numbers are an artifact of the method for treating studded tire costs and do not mean that the use of roads by heavy trucks reduced preservation costs.

Exhibit 5-4: Average Annual Cost Responsibility, State Highway Fund Detail (thousands of dollars)

Declared Weight in Pounds			Modernization	Preservation	Maintenance	Bridge	Other	Total
1	to	10,000	32,703	12,909	157,186	7,376	308,830	519,004
10,001	to	26,000	2,447	-241	8,512	594	6,197	17,508
26,001	to	78,000	2,103	-230	6,920	373	12,536	21,702
78,001	to	80,000	12,402	-1,901	41,372	1,250	35,399	88,522
80,001	to	104,000	3,459	-561	11,463	319	7,922	22,604
104,001	to	105,500	3,612	-587	11,840	286	7,307	22,458
105,501	and	up	505	-44	802	465	220	1,948
Total			57,231	9,346	238,095	10,663	378,412	693,746
Total for Vehicles Under 10,001 Pounds			32,703	12,909	157,186	7,376	308,830	519,004
% for Vehicles Under 10,001 Pounds			57.1%	138.1%	66.0%	69.2%	81.6%	74.8%
Total for Vehicles Over 10,000 Pounds			24,528	-3,563	80,909	3,287	69,581	174,742
% for Vehicles Over 10,000 Pounds			42.9%	-38.1%	34.0%	30.8%	18.4%	25.2%
Total for Vehicles Under 26,001 Pounds			35,150	12,669	165,697	7,970	315,027	536,513
% for Vehicles Under 26,001 Pounds			61.4%	135.5%	69.6%	74.7%	83.2%	77.3%
Total for Vehicles Over 26,000 Pounds			22,081	-3,323	72,398	2,694	63,384	157,234
% for Vehicles Over 26,000 Pounds			38.6%	-35.5%	30.4%	25.3%	16.8%	22.7%

Exhibit 5-5: Average Annual Cost Responsibility, Federal Detail (thousands of dollars)

Declared Weight in Pounds			Modernization	Preservation	Maintenance	Bridge	Other	Total
1	to	10,000	65,734	13,305	39,053	38,152	117,188	273,432
10,001	to	26,000	5,965	3,419	3,372	3,475	4,048	20,279
26,001	to	78,000	5,388	3,193	2,913	2,229	4,440	18,162
78,001	to	80,000	33,675	20,799	19,203	6,915	16,383	96,975
80,001	to	104,000	9,385	6,198	5,515	1,957	3,781	26,836
104,001	to	105,500	9,933	6,611	5,757	1,757	3,729	27,788
105,501	and	up	736	553	424	2,843	215	4,772
Total			130,816	54,079	76,236	57,329	149,785	468,244
Total for Vehicles Under 10,001 Pounds			65,734	13,305	39,053	38,152	117,188	273,432
% for Vehicles Under 10,001 Pounds			50.2%	24.6%	51.2%	66.5%	78.2%	58.4%
Total for Vehicles Over 10,000 Pounds			65,083	40,773	37,183	19,177	32,597	194,812
% for Vehicles Over 10,000 Pounds			49.8%	75.4%	48.8%	33.5%	21.8%	41.6%
Total for Vehicles Under 26,001 Pounds			71,699	16,724	42,424	41,627	121,237	293,711
% for Vehicles Under 26,001 Pounds			54.8%	30.9%	55.6%	72.6%	80.9%	62.7%
Total for Vehicles Over 26,000 Pounds			59,117	37,355	33,811	15,702	28,548	174,533
% for Vehicles Over 26,000 Pounds			45.2%	69.1%	44.4%	27.4%	19.1%	37.3%

Exhibit 5-6: Average Annual Cost Responsibility, Local Government Detail (thousands of dollars)

Declared Weight in Pounds			Modernization	Preservation	Maintenance	Bridge	Other	Total
1	to	10,000	61,319	17,378	54,796	1,518	103,814	238,825
10,001	to	26,000	1,903	6,089	17,044	237	2,012	27,285
26,001	to	78,000	1,697	6,384	17,815	167	1,468	27,531
78,001	to	80,000	2,753	13,324	37,049	147	1,607	54,880
80,001	to	104,000	995	5,087	14,135	42	502	20,760
104,001	to	105,500	1,277	6,655	18,487	49	608	27,075
105,501	and	up	187	1,118	3,101	147	49	4,602
Total			70,130	56,035	162,426	2,307	110,060	400,957
Total for Vehicles Under 10,001 Pounds			61,319	17,378	54,796	1,518	103,814	238,825
% for Vehicles Under 10,001 Pounds			87.4%	31.0%	33.7%	65.8%	94.3%	59.6%
Total for Vehicles Over 10,000 Pounds			8,811	38,657	107,630	789	6,246	162,132
% for Vehicles Over 10,000 Pounds			12.6%	69.0%	66.3%	34.2%	5.7%	40.4%
Total for Vehicles Under 26,001 Pounds			63,222	23,467	71,840	1,755	105,827	266,110
% for Vehicles Under 26,001 Pounds			90.1%	41.9%	44.2%	76.1%	96.2%	66.4%
Total for Vehicles Over 26,000 Pounds			6,721	32,568	90,586	552	4,233	134,660
% for Vehicles Over 26,000 Pounds			9.6%	58.1%	55.8%	23.9%	3.8%	33.6%

Exhibit 5-7: Average Annual Cost Responsibility, Bond Detail (thousands of dollars)

Declared Weight in Pounds			Modern-ization	Preser-vation	Mainte-nance	Bridge	Other	Current	Prior	Total
1	to	10,000	2,607	24	27	7,438	4,213	14,308	89,401	103,709
10,001	to	26,000	262	10	11	839	97	1,218	8,353	9,571
26,001	to	78,000	231	9	10	543	68	861	7,955	8,816
78,001	to	80,000	1,457	54	74	1,975	214	3,774	32,120	35,894
80,001	to	104,000	415	16	22	426	51	931	16,918	17,849
104,001	to	105,500	434	18	23	392	49	915	18,143	19,058
105,501	and	up	55	2	2	674	4	736	373	1,109
Total			5,461	133	168	12,286	4,695	22,743	173,262	196,005
Total for Vehicles Under 10,001 Pounds			2,607	24	27	7,438	4,213	14,308	89,401	103,709
% for Vehicles Under 10,001 Pounds			47.7%	17.9%	16.0%	60.5%	89.7%	62.9%	51.6%	52.9%
Total for Vehicles Over 10,000 Pounds			2,854	109	141	4,849	482	8,434	83,862	92,296
% for Vehicles Over 10,000 Pounds			52.3%	82.1%	84.0%	39.5%	10.3%	37.1%	48.4%	47.1%
Total for Vehicles Under 26,001 Pounds			2,870	33	38	8,276	4,310	15,527	97,753	113,280
% for Vehicles Under 26,001 Pounds			52.6%	25.1%	22.4%	67.4%	91.8%	68.3%	56.4%	57.8%
Total for Vehicles Over 26,000 Pounds			2,591	100	130	4,010	385	7,216	75,509	82,725
% for Vehicles Over 26,000 Pounds			47.4%	74.9%	77.6%	32.6%	8.2%	31.7%	43.6%	42.2%

Because pavements and bridges represent two of the largest and most important expenditure areas in a highway cost allocation study, the responsibility results for these expenditures are broken out separately in Exhibits 5-8 and 5-9.

Exhibit 5-8 shows that pavement expenditures allocated in the 2013 Study total $457.9 million, 97 percent of the pavement expenditures allocated in the 2011 Study.

The responsibility shares for particular types of pavement work are similar between the two studies. Both studies found heavy vehicles responsible for relatively larger shares of new pavement, reconstruction, rehabilitation, and maintenance expenditures, with heavy vehicles in the 2013 Study bearing relatively more responsibility for all types of pavement work except new pavement. For this exhibit, other pavement expenditures include those for climbing lanes, pavement striping and marking, maintenance of truck scale pavements, and studded tire damage repair.

Given the substantial changes to the distress equations in the 2010 NAPCOM model (which is used to generate pavement factors for pavement expenditure allocation), the pavement expenditure allocation based on the 2011 pavement factors was compared to the pavement expenditure allocation when using the 2009 Study pavement factors with the 2011 model. First, the pavement factors developed for the 2011 Study for light vehicles are slightly lower than those from the 2009 Study. Pavement factors are also lower for certain heavy vehicle weight classes but are offset by increases in the pavement factors for other heavy vehicle classes. Sensitivity analyses performed using new pavement factors demonstrated that pavement expenditure allocations are highly sensitive to the basic vehicle pavement factors. Overall, basic vehicle pavement expenditure responsibility in the 2011 Study is about 3 percentage points lower when using the 2011 pavement factors than when using the 2009 pavement factors.

Exhibit 5-9 compares the bridge plus interchange expenditure amounts and responsibility results in the 2011 and present studies. Bridge-related expenditures were lower as a share of total expenditures in the current study (8.1 percent) than in the three most recent studies (11.4 percent in 2011, 10.1 percent in 2009, and 15.0 percent in 2007).

The heavy vehicle responsibility share for total bridge plus interchange expenditures in the present study is 24.9

Exhibit 5-8: Comparison of Pavement Responsibility Results from 2011 and 2013 OR HCASs (thousands of annual dollars)

	2011 Study			2013 Study		
Expenditure Work Type	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility
New Pavements	67,251	10,483	56,768	57,185	9,864	47,320
	4.5%	15.6%	84.4%	3.6%	17.3%	82.7%
Pavement and Shoulder Reconstruction	26,959	7,115	19,844	19,734	3,003	16,731
	1.8%	26.4%	73.6%	1.2%	15.2%	84.8%
Pavement and Shoulder Rehabilitation	103,693	36,581	67,112	98,921	23,598	75,323
	6.9%	35.3%	64.7%	6.2%	23.9%	76.1%
Pavement Maintenance	250,115	98,727	151,388	263,624	62,281	201,344
	16.6%	39.5%	60.5%	16.6%	23.6%	76.4%
Other Pavement Expenditures	25,452	22,865	2,586	18,451	16,564	1,886
	1.7%	89.8%	10.2%	1.2%	89.8%	10.2%
Total Pavement Expenditures	473,470	175,771	297,699	457,914	115,310	342,604
	31.4%	37.1%	62.9%	28.9%	25.2%	74.8%

Exhibit 5-9: Comparison of Bridge and Interchange Responsibility Results from 2011 and 2013 OR HCASs (thousands of dollars)

	2011 Study			2013 Study		
Expenditure Work Type	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility
Bridge and Interchange	144,292	64,362	79,930	76,901	49,339	27,562
	9.6%	44.6%	55.4%	4.8%	64.2%	35.8%
Bridge Maintenance	27,091	24,672	2,420	51,475	47,084	4,391
	1.8%	91.1%	8.9%	3.2%	91.5%	8.5%
Total Bridge and Interchange Expenditures	171,384	89,034	82,350	128,376	96,423	31,953
	11.4%	51.9%	48.1%	8.1%	75.1%	24.9%

percent, compared to 48.1 percent in the 2011 Study and 51.3 percent in the 2009 Study. This reflects the results of a new bridge cost allocation study completed for the 2013 study.

Exhibit 5-10 shows the amounts of allocated expenditures of bond revenues, including the amount that carried forward from the prior studies. These represent amounts that were spent in prior biennia and that will be repaid during the 2013-15 biennium. The 2015 Study will include the same allocated expenditures from the 2003, 2005, 2007, 2009, and 2011 studies as well as allocated bond expenditures from the current study.

For illustrative purposes, Exhibit 5-11 compares the expenditure allocation results (with prior allocated costs) for the present study with those of the previous study. As shown, the shares are very similar: the all-vehicle responsibility shares in the 2011 Study are 64.6 percent for light vehicles and 35.4 percent for heavy vehicles; the 2013 Study shares are 64.5 percent for light vehicles and 35.5 percent for heavy vehicles.

Revenue Attribution Results

The attribution of revenues to the various vehicle types and weight classes is an important element of a highway cost allocation study. Once accomplished, the shares of projected payments are compared to the shares of cost responsibility for each class to determine whether each class is paying more or less than its fair share under the existing tax structure and rates. Where significant imbalances are detected, recommendations for changes in tax rates

Exhibit 5-10: Average Annual Cost Responsibility by Weight Group with Prior Allocated Expenditures (thousands of dollars)

Declared Weight in Pounds			Total Without Prior Allocated Expenditures	Prior Allocated Expenditures	Total With Prior Allocated Expenditures
1	to	10,000	1,045,569	89,401	1,134,970
10,001	to	26,000	66,291	8,353	74,643
26,001	to	78,000	68,255	7,955	76,210
78,001	to	80,000	244,151	32,120	276,271
80,001	to	104,000	71,131	16,918	88,049
104,001	to	105,500	78,236	18,143	96,379
105,501	and	up	12,058	373	12,431
Total			1,585,690	173,262	1,758,953

Exhibit 5-11: Cost Responsibility Distributions by Weight Group: Comparison Between 2011 and 2013 OR HCASs

Declared Weight in Pounds			2011 Study	2013 Study	Change in Percentage
1	to	10,000	64.6%	64.5%	-0.1%
10,001	to	26,000	3.9%	4.2%	0.3%
26,001	to	78,000	4.0%	4.3%	0.3%
78,001	to	80,000	15.0%	15.7%	0.7%
80,001	to	104,000	5.2%	5.0%	-0.2%
104,001	to	105,500	6.8%	5.5%	-1.3%
105,501	and	up	0.5%	0.7%	0.2%
Total			100.0%	100.0%	

are made to bring payments back into balance with cost responsibilities.

As noted in Chapter 4, most of the required revenue data for the study, including control totals for forecasted revenues by tax instrument (e.g, fuel, registration, weight-mile), are obtained from ODOT's revenue forecasting model. Every effort is made to ensure that the data used in the HCAS are consistent with the most recent revenue forecast available at the time the study is being conducted. Some information required for the HCAS, however, is not available from the revenue forecasting model and so must be estimated from other sources. The revenue model, for example, does not project fuel tax payments by detailed, 2,000-pound weight class. Therefore, estimated fuel efficiencies by vehicle type and weight group must be used together with control totals from the revenue model to attribute projected fuel tax payments to the detailed vehicle classes.

The revenue attribution results are summarized in Exhibit 5-12. For the next biennium, under existing tax rates, it is forecasted that light vehicles will contribute 65.1 percent of State Highway Fund revenues and heavy vehicles will contribute 34.9 percent. The 34.9 percent projected payment share for heavy vehicles is less than the overall responsibility share of 35.5 percent for these vehicles reported earlier in this chapter.

Exhibit 5-12 also illustrates how the relative payments of different vehicle weight groups vary by tax instrument. Light vehicles are projected to contribute approximately 96.6 percent of fuel tax

Exhibit 5-12: Average Annual User-Fee Revenue by Tax Instrument and Weight Class (thousands of dollars)

Declared Weight in Pounds			Fuel Tax	Registration and Title Fees	Weight-Mile Tax	Other Motor Carrier	Flat Fee	RUAF	Total
1	to	10,000	497,436	215,462	0	0	0	0	712,899
10,001	to	26,000	14,149	31,949	0	0	0	0	46,099
26,001	to	78,000	2,833	6,084	19,792	776	60	0	29,544
78,001	to	80,000	323	29,917	176,002	3,424	3,714	0	213,380
80,001	to	104,000	119	5,583	34,115	642	4,960	35	45,454
104,001	to	105,500	221	6,527	37,107	684	773	21	45,331
105,501	and	up	0	183	0	12	0	2,903	3,099
Total			515,082	295,705	267,016	5,538	9,506	2,959	1,095,805
Total for Vehicles Under 10,001 Pounds			497,436	215,462	0	0	0	0	712,899
% for Vehicles Under 10,001 Pounds			96.6%	72.9%	0.0%	0.0%	0.0%	0.0%	65.1%
Total for Vehicles Over 10,000 Pounds			17,645	80,243	267,016	5,538	9,506	2,959	382,907
% for Vehicles Over 10,000 Pounds			3.4%	27.1%	100.0%	100.0%	100.0%	100.0%	34.9%
Total for Vehicles Under 26,001 Pounds			511,586	247,411	0	0	0	0	758,997
% for Vehicles Under 26,001 Pounds			99.3%	83.7%	0.0%	0.0%	0.0%	0.0%	69.3%
Total for Vehicles Over 26,000 Pounds			3,496	48,294	267,016	5,538	9,506	2,959	336,808
% for Vehicles Over 26,000 Pounds			0.7%	16.3%	100.0%	100.0%	100.0%	100.0%	30.7%

revenues and 72.9 percent of registration and title fee revenues. Heavy vehicles, on the other hand, contribute 100 percent of weight-mile tax, flat fee, and road use assessment fee revenues. Heavy vehicles also contribute 100 percent of the other motor carrier revenue identified in the exhibit. This category includes revenues from truck overweight/overlength permit fees, late payment penalties and interest, etc.

Exhibit 5-13 compares the revenue attribution results of the present study with those of the 2011 Study. The projected share of revenues contributed by light vehicles has decreased from 65.9 percent in the 2011 Study to 65.1 percent in the present study. Conversely, the overall heavy vehicle share of projected payments has increased from 34.1 percent in the previous study to 34.9 percent in the present study.

Exhibit 5-13: Revenue Attribution Distributions by Weight Group: Comparison Between 2011 and 2013 OR HCASs

Declared Weight in Pounds			2011 Study	2013 Study	Change in Percentage
1	to	10,000	65.9%	65.1%	-0.8%
10,001	to	26,000	4.1%	4.2%	0.1%
26,001	to	78,000	2.4%	2.7%	0.3%
78,001	to	80,000	19.1%	19.5%	0.4%
80,001	to	104,000	3.7%	4.1%	0.4%
104,001	to	105,500	4.6%	4.1%	-0.5%
105,501	and	up	0.2%	0.3%	0.1%
Total			100.0%	100.0%	

Chapter 6

Comparison of Expenditures Allocated to Revenues Paid

This chapter brings together the expenditure allocation and revenue attribution results reported in Chapter 5 to compare projected responsibilities and tax payments for each vehicle class and for broader groups of vehicles (e.g., all heavy vehicles combined). This comparison is facilitated by the calculation of equity ratios, or the ratio of the share of revenues contributed by the vehicles in a class to the share of cost responsibility for vehicles in that class. An equity ratio greater than one indicates that the vehicles in that class are projected to pay more than their cost-responsible share of user fees. Conversely, an equity ratio less than one indicates that the vehicles in that class are projected to pay less than their cost-responsible share.

The comparison of revenue shares to cost responsibility shares in the Oregon studies is traditionally done for full-fee-paying vehicles only. This study takes the same approach, which requires some further adjustments to the numbers presented in Chapter 5. The model separately estimates the revenue contributions from full-fee-paying and alternative-fee-paying vehicles for each tax instrument. For alternative-fee-paying vehicles, the model also estimates the fees they would pay if they were full-fee-paying vehicles. The expenditures allocated to each vehicle class are apportioned among full-fee-paying and alternative-fee-paying vehicles on the basis of the relative miles of travel of each in that class.[1]

Presentation of Equity Ratios

Exhibit 6-1 includes calculated equity ratios for the summary-level weight groups shown in earlier exhibits. Exhibit 6-3, at the end of this chapter, shows the equity ratios for each 2,000-pound weight class. It needs to be emphasized that these equity ratios are for full-fee-paying vehicles only, and exclude vehicles that pay on an alternative-fee basis.

As shown in the first table within Exhibit 6-1, projected 2014 vehicle miles traveled (VMT) for full-fee-paying vehicles are 37.9 billion, 93.4 percent of these miles being traveled by light vehicles and 6.6 percent by heavy vehicles. This compares to projected 2014 miles of travel by all vehicles of 39.0 billion, 92.7 percent by light vehicles and 7.3 percent by heavy vehicles. As explained in Chapter 3, alternative-fee-paying vehicles are disproportionately concentrated in the heavy vehicle classes, so excluding them will reduce the heavy vehicle share of VMT. The heavy vehicle percentage share of VMT, in other words, will always be

[1] If, for example, 80 percent of the VMT in a weight class are by full-fee-paying vehicles and 20 percent are by alternative-fee-paying vehicles, then 80 percent of the total responsibility of that class is assigned to full-fee-paying vehicles and 20 percent to alternative-fee-paying vehicles. This division is based on the reasonable assumption that two vehicles that are identical, except one is subject to full fees and the other alternative fees, have exactly the same per-mile cost responsibility.

lower if only full-fee-paying vehicles are considered than if all vehicles are considered.

The projected total cost responsibility of full-fee-paying vehicles is $1.69 billion, with responsibility shares of 65.9 percent for light vehicles and 34.1 percent for heavy vehicles. This compares to the projected total responsibility for all vehicles of $1.76 billion. The difference between these two amounts is the projected responsibility of alternative-fee-paying vehicles.

Forecasted average annual user fees paid by full-fee-paying vehicles total $1.08 billion, 65.0 percent from light vehicles and 35.0 percent from heavy vehicles. The difference between this total and the $1.10 billion total for all vehicles represents projected revenues from alternative-fee-paying vehicles.

The total of the Allocated Alternative-Fee Difference column represents the average annual difference between what alternative-fee-paying vehicles are projected to pay and what they would pay if subject to full fees. This total is $25.3 million annually for the next biennium under existing tax rates.[2] In the approach used in previous studies, this amount would be reassigned to the full-fee-paying vehicle classes based on the relative VMT of each class. In this study, it is not allocated to full-fee-paying vehicles.

Because the current study includes expenditures of funds from federal and local revenue sources, the allocated expenditures for full-fee-paying vehicles are more than the attributed state revenues for these vehicles. This does not present a problem in calculating the equity ratios.[3]

The equity ratios are calculated two different ways to illustrate the effects of considering only full-fee-paying vehicle costs and revenues and of adding the allocated alternative-fee difference, as in previous studies. The last table in Exhibit 6-1 presents the unadjusted and alternative-fee difference-adjusted equity ratios for full-fee-paying vehicles. The unadjusted ratios are more important in this study, however, because the consultant and Study Review Team recommend that the unadjusted results form the basis for determining whether rates should be adjusted.

This study finds overall equity ratios of 0.9871 for light vehicles and 1.0250 for heavy vehicles as a group. This means that, for the 2013-15 biennium, under the existing tax structure and rates, light vehicles are expected to underpay their fair share by 1.3 percent and heavy vehicles are expected to overpay by 2.5 percent.

Exhibit 6-1 also shows the overall equity ratios for vehicles under and over 26,000 pounds, as well as for the summary-level weight groups shown in earlier exhibits. Vehicles with declared weights between 10,001 pounds and 26,000 pounds are projected to overpay their responsibility by 13.5 percent. Vehicles with weights between 26,001 and 78,000 pounds as a group underpay their fair share by 10.4 percent and those between 78,001 and 80,000 pounds overpay by 21.5 percent.

Vehicles in the 78,001-80,000 pound class alone account for 46.4 percent of the VMT by full-fee-paying heavy vehicles and 60.0 percent of the VMT by over 26,000-pound vehicles. These vehicles also account for 47.7 percent of the cost responsibility and 56.5 percent of the user fees paid by

[2] These amounts represent the underpayment by alternative-fee-paying vehicles relative to what they would pay on a full-fee basis – the difference, for example, between revenues from publicly owned vehicles under the existing tax structure versus revenues from these vehicles if they were all subject to the state fuel tax or weight- mile tax and full registration fees.

[3] The calculation of equity ratios in the model is accomplished by comparing ratios of revenues attributed to ratios of expenditures allocated. For each vehicle class, the ratio of the revenues attributed to this class to the total revenues attributed to all classes is first calculated. This ratio is then divided by the ratio of the expenditures allocated to this class to the total expenditures allocated to all classes. Thus, the calculation of the equity ratios does not require scaling of either the attributed revenues or allocated expenditures when the two are not equal.

full-fee-paying heavy vehicles. The reason for the large difference in the equity ratio between this group and the groups above and below it is that most truckers who are capable of operating at 80,000 pounds and do not know in advance how much their loads will weigh, declare at 80,000 pounds. As a result, the average operating weights of vehicles declared at 80,000 pounds are a lower fraction of their declared weight than for other declared weight classes, and the wear-related costs they impose per mile are correspondingly lower.

As a group, vehicles between 80,001 and 105,500 pounds (Schedule B vehicles) pay 21.7 percent less than their fair share. Those in the 104,001 to 105,500 range pay 24.8 percent less than their fair share.

Vehicles over 105,500 pounds all pay the road use assessment fee, as do some vehicles between 98,001 and 105,500 pounds. Those over 105,500 pounds underpay their fair share by 61.1 percent, an increase of about 9 percent from the 2011 Study. This study and the 2005, 2007, 2009, and 2011 studies report smaller underpayments for these vehicles than did the 2001 and 2003 studies primarily because the model was changed for the 2005 Study to attribute portions of vehicle registration fees to these vehicles. Since no vehicle can register above 105,500 pounds, no registration fees were attributed to these vehicles in earlier studies.

Comparison with the 1999, 2001, 2003, 2005, 2007, 2009, and 2011 Oregon Studies

The overall light and heavy vehicle equity ratios found by this study are slightly different from those determined by the prior five Oregon studies (see Exhibit 6-2). The alternative-fee-difference-adjusted equity ratios found by the 1999 Study were 0.97 for light vehicles and 1.05 for heavy vehicles as a group, indicating a projected underpayment of 3 percent by light vehicles and overpayment of 5 percent by heavy vehicles. The analysis period for the 1999 Study was the 1999-2001 biennium. On the basis of these results, the 1999 Legislature enacted an across-the-board 12.3 percent reduction in the weight-mile tax rates.[4] This reduction became effective September 1, 2000.

The 2001 Study found adjusted equity ratios of 1.003 for light vehicles and 0.995 for heavy vehicles as a group. This indicated a situation of near-perfect equity for the 2001-03 biennium analysis period, that is, a 0.3 percent projected overpayment by full-fee-paying light vehicles and a 0.5 percent projected underpayment by heavy vehicles. As a consequence, no adjustment in tax rates was deemed necessary by the legislature to satisfy the constitutional requirement of "fairness and proportionality" between light and heavy vehicles.

The 2003 Study found adjusted equity ratios of 0.9921 for light vehicles and 1.0158 for heavy vehicles. The 2003 Legislature did not change rates as a direct result of the 2003 Study but did increase registration and other fees to meet the debt-service requirements of the OTIA III bond program. Those fee increases were designed to preserve light/heavy equity given the nature of the projects they would fund, and the results of this study indicate that they succeeded.

The 2005 Study found adjusted equity ratios of 1.0032 for light vehicles and 0.9936 for heavy vehicles. This indicated near-perfect equity for the 2005-07 biennium analysis period: a 0.32 percent projected overpayment by full-fee paying light vehicles and a 0.64 percent underpayment by full-fee paying heavy vehicles.

The 2007 Study found adjusted equity ratios of 0.9933 for light vehicles and 1.0129 for heavy vehicles. As in the 2005 Study, these equity ratios indicated near-

[4] The overall results of the 1999 Study were implemented by a proportionate reduction in all the weight-mile tax rates. The legislature, however, did not implement the detailed recommendations of the 1999 or 2001 studies.

perfect equity for the 2007-09 biennium analysis period.

The 2009 Study found adjusted equity ratios of 0.9915 for light vehicles and 1.0173 for heavy vehicles, and the 2011 Study found adjusted equity ratios of 0.9954 for light vehicles and 1.0089 for heavy vehicles. As in recent studies, these equity ratios indicated near-perfect equity for the 2009-11 and 2011-13 biennium analysis periods.

All of the recent prior studies, as well as this current study, have projected an overpayment by vehicles in the 78,001-80,000 pound class and an underpayment by vehicles weighing more than 80,000 pounds.

Exhibit 6-1: Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

			Annual VMT			Percent of Annual VMT		
Declared Weight			All	Full-Fee	Alternative Fee	All	Full-Fee	Alternative Fee
1	to	10,000	36,123,261,967	35,424,710,036	698,551,930	92.7%	93.4%	67.8%
10,001	to	26,000	721,886,826	569,620,281	152,266,544	1.9%	1.5%	14.8%
26,001	to	78,000	449,601,973	283,348,430	166,253,542	1.2%	0.7%	16.1%
78,001	to	80,000	1,173,912,928	1,167,427,014	6,485,914	3.0%	3.1%	0.6%
80,001	to	104,000	260,038,599	257,836,782	2,201,817	0.7%	0.7%	0.2%
104,001	to	105,500	236,582,661	232,631,322	3,951,339	0.6%	0.6%	0.4%
105,501	and	up	4,074,981	4,074,981	0	0.0%	0.0%	0.0%
	Total		38,969,359,934	37,939,648,847	1,029,711,087	100.0%	100.0%	100.0%
10,001	and	up	2,846,097,967	2,514,938,811	331,159,156	7.3%	6.6%	32.2%
26,001	to	80,000	1,623,514,901	1,450,775,444	172,739,456	4.2%	3.8%	16.8%
80,001	to	105,500	496,621,260	490,468,104	6,153,156	1.3%	1.3%	0.6%
26,001	to	105,500	2,120,136,161	1,941,243,548	178,892,612	5.4%	5.1%	17.4%
26,001	and	up	2,124,211,141	1,945,318,529	178,892,612	5.5%	5.1%	17.4%

			Annual Cost Responsibility					Percent of Cost Responsibility				
Declared Weight			State	Federal	Local	Total	Full-Fee	State	Federal	Local	Total	Full-Fee
1	to	10,000	622,713,150	273,431,660	238,825,018	1,134,969,828	1,113,021,772	70.0%	58.4%	59.6%	64.5%	65.9%
10,001	to	26,000	27,079,383	20,278,894	27,285,221	74,643,498	57,023,681	3.0%	4.3%	6.8%	4.2%	3.4%
26,001	to	78,000	30,517,653	18,162,073	27,530,579	76,210,305	50,276,491	3.4%	3.9%	6.9%	4.3%	3.0%
78,001	to	80,000	124,415,802	96,975,035	54,879,691	276,270,528	274,744,123	14.0%	20.7%	13.7%	15.7%	16.3%
80,001	to	104,000	40,452,121	26,836,382	20,760,233	88,048,736	87,277,310	4.5%	5.7%	5.2%	5.0%	5.2%
104,001	to	105,500	41,515,595	27,787,886	27,075,159	96,378,640	94,768,034	4.7%	5.9%	6.8%	5.5%	5.6%
105,501	and	up	3,057,575	4,771,902	4,601,533	12,431,010	12,428,945	0.3%	1.0%	1.1%	0.7%	0.7%
Total			889,751,280	468,243,833	400,957,432	1,758,952,545	1,689,540,356	100.0%	100.0%	100.0%	100.0%	100.0%
10,001	and	up	267,038,130	194,812,173	162,132,415	623,982,717	576,518,584	30.0%	41.6%	40.4%	35.5%	34.1%
26,001	to	80,000	154,933,455	115,137,109	82,410,269	352,480,833	325,020,614	17.4%	24.6%	20.6%	20.0%	19.2%
80,001	to	105,500	81,967,716	54,624,268	47,835,392	184,427,376	182,045,344	9.2%	11.7%	11.9%	10.5%	10.8%
26,001	to	105,500	236,901,172	169,761,376	130,245,661	536,908,209	507,065,958	26.6%	36.3%	32.5%	30.5%	30.0%
26,001	and	up	239,958,747	174,533,279	134,847,194	549,339,219	519,494,902	27.0%	37.3%	33.6%	31.2%	30.7%

Exhibit 6-1 (continued)

Declared Weight			Annual User Fees All	Full-Fee	Alternative-Fee Difference	Allocated Alternative-Fee Difference	Percent of User Fees All	Full-Fee	Alternative-Fee Difference	Allocated Alternative-Fee Difference
1	to	10,000	712,898,627	703,299,468	4,269,443	23,603,339	65.1%	65.0%	16.9%	93.4%
10,001	to	26,000	46,098,571	41,424,254	6,873,667	379,536	4.2%	3.8%	27.2%	1.5%
26,001	to	78,000	29,544,265	28,823,794	11,006,279	188,794	2.7%	2.7%	43.5%	0.7%
78,001	to	80,000	213,380,139	213,689,193	1,496,255	777,852	19.5%	19.8%	5.9%	3.1%
80,001	to	104,000	45,453,722	45,617,227	556,524	171,796	4.1%	4.2%	2.2%	0.7%
104,001	to	105,500	45,331,095	45,632,652	1,076,865	155,001	4.1%	4.2%	4.3%	0.6%
105,501	and	up	3,099,037	3,099,032	0	2,715	0.3%	0.3%	0.0%	0.0%
Total			1,095,805,454	1,081,585,620	25,279,032	25,279,032	100.0%	100.0%	100.0%	100.0%
10,001	and	up	382,906,827	378,286,153	21,009,589	1,675,693	34.9%	35.0%	83.1%	6.6%
26,001	to	80,000	242,924,403	242,512,988	12,502,534	966,646	22.2%	22.4%	49.5%	3.8%
80,001	to	105,500	90,784,817	91,249,879	1,633,389	326,797	8.3%	8.4%	6.5%	1.3%
26,001	to	105,500	333,709,220	333,762,867	14,135,922	1,293,443	30.5%	30.9%	55.9%	5.1%
26,001	and	up	336,808,257	336,861,899	14,135,922	1,296,158	30.7%	31.1%	55.9%	5.1%

Declared Weight			Share of Full-Fee Revenues	Share of Full-Fee Costs	Share of Full-Fee Costs + Allocated Difference	**Full-Fee Equity Ratio**	Difference-Adjusted Full-Fee Equity Ratio
1	to	10,000	65.0%	65.9%	66.3%	**0.9871**	0.9810
10,001	to	26,000	3.8%	3.4%	3.3%	**1.1348**	1.1441
26,001	to	78,000	2.7%	3.0%	2.9%	**0.8956**	0.9056
78,001	to	80,000	19.8%	16.3%	16.1%	**1.2150**	1.2297
80,001	to	104,000	4.2%	5.2%	5.1%	**0.8165**	0.8270
104,001	to	105,500	4.2%	5.6%	5.5%	**0.7522**	0.7622
105,501	and	up	0.3%	0.7%	0.7%	**0.3895**	0.3952
Total			100.0%	100.0%	100.0%	**1.0000**	1.0000
10,001	and	up	34.98%	34.1%	33.7%	**1.0250**	1.0373
26,001	to	80,000	22.4%	19.2%	19.0%	**1.1656**	1.1795
80,001	to	105,500	8.4%	10.8%	10.6%	**0.7830**	0.7933
26,001	to	105,500	30.9%	30.0%	29.6%	**1.0282**	1.0409
26,001	and	up	31.1%	30.7%	30.4%	**1.0129**	1.0255

Exhibit 6-2: Comparison of Equity Ratios from the 1999, 2001, 2003, 2005, 2007, 2009, 2011, and 2013 Oregon Highway Cost Allocation Studies

			Alternative-Fee Difference Adjusted Equity Ratios for Full-Fee-Paying Vehicles							
Declared Weight			1999	2001	2003	2005	2007	2009	2011	2013
1	to	10,000	0.9700	1.0027	0.9921	1.0032	0.9933	0.9915	0.9954	0.9810
10,001	to	26,000	1.0000	0.9440	1.3803	1.1846	1.2557	1.1576	1.2439	1.1441
26,001	to	78,000		0.9596	1.0091	0.7401	0.7485	0.7881	0.8301	0.9056
78,001	to	80,000		1.0603	1.0931	1.0610	1.1274	1.1234	1.2630	1.2297
80,001	to	104,000		0.9479	0.7430	0.9034	0.8427	0.8278	0.7114	0.8270
104,001	to	105,500		0.8712	0.7576	0.8759	0.8299	0.9210	0.6813	0.7622
105,501	and	up	1.3500	0.4727	0.2678	0.6395	0.6127	0.5932	0.4776	0.3952
Total			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10,001	and	up	1.0500	0.9952	1.0158	0.9936	1.0129	1.0173	1.0089	1.0373
26,001	to	80,000				1.0189	1.0742	1.0655	1.1903	1.1795
80,001	to	105,500				0.8880	0.8357	0.8763	0.6945	0.7933
26,001	to	105,500				0.9812	1.0007	1.0068	0.9934	1.0409
26,001	and	up		0.9996	0.9870	0.9789	0.9984	1.0013	0.9857	1.0255

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
1	0	36,123,261,967	35,424,710,036	1,134,969,828	1,113,021,772	712,898,627	703,299,468	4,269,443	23,603,339	0.9871	0.9810
10,001	0	130,058,386	101,691,125	7,206,852	5,634,953	6,138,459	5,307,982	650,212	67,756	1.4715	1.4757
12,001	0	72,954,352	56,311,758	4,784,705	3,693,202	3,774,485	3,287,093	484,089	37,520	1.3903	1.3969
14,001	0	136,662,763	120,360,396	10,182,133	8,967,516	8,538,882	8,048,353	599,590	80,196	1.4020	1.4103
16,001	0	70,700,727	65,095,601	6,047,659	5,568,203	4,950,283	4,841,398	307,989	43,373	1.3582	1.3679
18,001	0	69,180,408	60,313,648	6,795,510	5,924,539	5,123,999	4,984,317	593,067	40,187	1.3142	1.3249
20,001	0	19,693,623	11,324,098	2,437,968	1,401,864	1,105,223	894,343	450,120	7,545	0.9966	1.0061
22,001	0	36,635,216	24,698,755	5,188,764	3,498,165	2,539,470	2,191,846	711,656	16,457	0.9788	0.9888
24,001	0	186,001,351	129,824,899	31,999,908	22,335,240	13,927,769	11,868,920	3,076,944	86,502	0.8301	0.8393
26,001	0	71,950,467	7,603,361	9,836,256	1,039,446	888,049	474,916	3,606,075	5,066	0.7137	0.7209
28,001	0	43,596,986	9,775,797	6,552,852	1,469,353	867,187	657,720	2,066,039	6,514	0.6992	0.7066
30,001	0	56,288,281	28,122,420	10,552,734	5,272,295	1,768,721	1,878,305	1,990,791	18,738	0.5565	0.5628
32,001	0	36,581,405	27,466,294	5,809,538	4,361,956	2,081,232	2,009,464	595,103	18,301	0.7196	0.7273
34,001	0	17,109,045	4,520,437	2,656,154	701,791	440,521	343,387	859,136	3,012	0.7643	0.7725
36,001	0	5,108,720	3,086,249	1,067,462	644,868	258,260	243,859	145,405	2,056	0.5907	0.5976
38,001	0	5,741,573	4,684,503	1,027,691	838,485	439,141	427,676	85,040	3,121	0.7968	0.8057
40,001	0	4,044,575	3,612,312	683,008	610,012	336,157	332,911	36,591	2,407	0.8525	0.8619
42,001	0	3,618,804	2,730,523	803,290	606,112	305,889	292,413	81,650	1,819	0.7536	0.7626
44,001	0	42,098,955	38,725,044	6,141,500	5,649,306	4,012,360	3,996,794	332,654	25,802	1.1052	1.1166
46,001	0	15,753,038	13,056,713	3,073,552	2,547,476	1,479,937	1,452,648	272,695	8,700	0.8908	0.9010
48,001	0	18,413,418	16,048,262	3,630,658	3,164,309	1,776,753	1,770,192	254,325	10,693	0.8739	0.8840
50,001	0	16,574,675	15,646,253	2,858,194	2,698,094	1,631,378	1,640,242	106,193	10,425	0.9496	0.9601
52,001	0	28,953,753	27,297,712	5,344,966	5,039,255	2,953,247	2,969,623	196,531	18,188	0.9205	0.9310
54,001	0	25,946,727	24,529,587	4,915,683	4,647,202	2,789,025	2,786,254	158,199	16,344	0.9366	0.9472
56,001	0	9,612,818	9,399,792	1,836,715	1,796,012	1,050,002	1,052,596	26,449	6,263	0.9155	0.9260

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
58,001	0	9,184,207	8,796,162	1,766,192	1,691,568	1,031,959	1,039,433	53,329	5,861	0.9599	0.9709
60,001	0	1,692,130	1,623,984	431,179	413,815	198,387	200,120	10,131	1,082	0.7554	0.7647
62,001	0	2,772,614	2,695,493	516,594	502,225	337,396	338,894	11,194	1,796	1.0541	1.0660
64,001	0	12,423,956	12,290,539	2,391,342	2,365,662	1,583,750	1,587,538	21,022	8,189	1.0483	1.0603
66,001	0	3,349,053	3,318,620	725,842	719,246	453,016	454,187	5,336	2,211	0.9864	0.9981
68,001	0	8,017,927	7,910,386	1,473,925	1,454,156	1,138,578	1,142,028	18,976	5,271	1.2268	1.2407
70,001	0	2,630,761	2,599,186	569,782	562,944	395,700	397,078	6,202	1,732	1.1018	1.1149
72,001	0	2,296,088	2,226,559	352,056	341,396	360,808	363,777	14,329	1,484	1.6645	1.6821
74,001	0	4,411,444	4,335,621	895,769	880,372	731,091	733,665	15,405	2,889	1.3018	1.3169
76,001	0	1,430,555	1,246,622	297,371	259,136	235,720	238,073	37,480	831	1.4351	1.4519
78,001	0	1,173,912,928	1,167,427,014	276,270,528	274,744,123	213,380,139	213,689,193	1,496,255	777,852	1.2150	1.2297
80,001	5	7,580,518	7,511,074	2,442,173	2,419,801	1,257,358	1,262,446	16,761	5,005	0.8150	0.8255
80,001	6	226,470	224,512	83,845	83,120	36,282	36,409	444	150	0.6842	0.6932
80,001	7	337,028	333,413	76,310	75,492	52,178	52,393	784	222	1.0841	1.0971
80,001	8	48,911	48,314	20,850	20,595	7,676	7,705	125	32	0.5845	0.5923
80,001	9	20,799	20,665	5,770	5,733	2,704	2,713	27	14	0.7392	0.7485
82,001	5	12,508,329	12,390,061	3,827,405	3,791,217	2,369,178	2,376,081	29,583	8,255	0.9790	0.9915
82,001	6	2,206,323	2,185,399	482,625	478,048	388,072	389,213	4,868	1,456	1.2718	1.2869
82,001	7	91,510	90,621	26,759	26,499	15,116	15,165	198	60	0.8940	0.9053
82,001	8	60,502	59,914	16,720	16,557	9,550	9,582	126	40	0.9040	0.9154
82,001	9	35,880	35,531	8,556	8,473	5,397	5,416	72	24	0.9985	1.0106
84,001	5	10,410,785	10,186,983	4,229,746	4,138,818	1,927,577	1,941,635	56,714	6,788	0.7328	0.7426
84,001	6	6,319,117	6,187,953	1,983,103	1,941,940	1,055,066	1,063,275	30,746	4,123	0.8553	0.8663
84,001	7	554,901	541,052	146,760	143,097	93,400	94,079	3,087	361	1.0270	1.0397
84,001	8	60,556	58,999	23,394	22,792	9,747	9,822	334	39	0.6731	0.6820

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
84,001	9	26,150	25,478	8,016	7,809	4,023	4,055	139	17	0.8110	0.8214
86,001	5	4,078,610	4,052,414	1,476,248	1,466,766	732,010	734,232	6,968	2,700	0.7820	0.7922
86,001	6	29,163,273	29,027,565	8,477,092	8,437,645	4,198,593	4,212,054	33,153	19,341	0.7798	0.7897
86,001	7	1,107,683	1,099,688	293,367	291,249	175,061	175,637	1,853	733	0.9420	0.9537
86,001	8	365,488	362,352	118,008	116,995	58,719	58,910	701	241	0.7866	0.7967
86,001	9	68,750	68,120	21,928	21,727	10,948	10,982	136	45	0.7896	0.7997
88,001	5	3,207,212	3,177,075	1,076,509	1,066,394	602,540	605,083	8,283	2,117	0.8863	0.8978
88,001	6	39,150,772	38,814,499	12,398,208	12,291,718	6,438,954	6,467,081	84,154	25,862	0.8219	0.8324
88,001	7	780,229	771,166	319,868	316,152	135,949	136,484	2,139	514	0.6744	0.6833
88,001	8	99,232	98,200	47,212	46,722	15,690	15,760	235	65	0.5269	0.5340
88,001	9	11,379	11,243	3,781	3,736	1,812	1,820	30	7	0.7610	0.7708
90,001	5	294,941	290,848	138,461	136,540	63,165	63,443	1,171	194	0.7258	0.7356
90,001	6	4,373,905	4,316,550	1,969,052	1,943,232	804,483	808,538	14,799	2,876	0.6500	0.6587
90,001	7	1,394,701	1,374,916	495,858	488,824	239,955	241,254	4,770	916	0.7710	0.7810
90,001	8	19,002	18,719	9,646	9,503	3,184	3,202	66	12	0.5263	0.5335
90,001	9	14,470	14,255	4,812	4,740	2,311	2,324	48	9	0.7659	0.7758
92,001	5	183,527	178,879	67,590	65,879	35,361	35,810	1,380	119	0.8491	0.8603
92,001	6	2,731,960	2,657,044	1,072,235	1,042,832	464,323	470,859	19,812	1,770	0.7053	0.7147
92,001	7	1,131,752	1,085,919	436,304	418,635	202,302	204,895	11,241	724	0.7645	0.7746
92,001	8	46,939	45,038	15,368	14,746	8,026	8,133	450	30	0.8615	0.8726
92,001	9	3,623	3,476	1,665	1,598	590	599	33	2	0.5853	0.5932
94,001	5	464,022	456,557	164,128	161,487	106,875	107,429	2,310	304	1.0392	1.0527
94,001	6	5,028,092	4,976,843	1,426,186	1,411,650	839,250	844,535	13,981	3,316	0.9345	0.9463
94,001	7	17,113,028	16,821,767	6,926,731	6,808,840	3,120,116	3,138,936	73,169	11,208	0.7201	0.7297
94,001	8	501,324	492,681	214,041	210,351	87,452	88,002	2,093	328	0.6535	0.6623

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
94,001	9	957	941	6,046	5,942	159	160	4	1	0.0420	0.0427
96,001	5	3,376,034	3,359,431	1,037,651	1,032,547	822,586	823,848	5,334	2,238	1.2464	1.2623
96,001	6	4,530,003	4,513,509	1,256,925	1,252,349	833,664	835,247	4,636	3,007	1.0418	1.0549
96,001	7	29,375,971	29,233,896	10,870,556	10,817,981	5,380,091	5,390,330	36,435	19,478	0.7784	0.7886
96,001	8	1,821,997	1,812,824	615,701	612,601	316,384	317,040	2,260	1,208	0.8084	0.8189
96,001	9	92,706	92,239	32,953	32,787	6,437	6,515	111	61	0.3104	0.3144
98,001	6	1,640,379	1,627,521	488,065	484,239	317,865	318,989	3,644	1,084	1.0290	1.0421
98,001	7	14,538,842	14,400,645	4,720,056	4,675,191	2,531,925	2,542,804	35,281	9,595	0.8496	0.8606
98,001	8	822,169	813,015	289,462	286,239	146,432	147,015	2,238	542	0.8023	0.8128
98,001	9	22,079	21,817	8,275	8,176	3,740	3,757	62	15	0.7178	0.7272
100,001	6	161,339	161,339	15,918	15,918	24,598	24,598	0	107	2.4140	2.4337
100,001	7	8,694,400	8,648,246	2,735,474	2,720,953	1,592,728	1,596,590	12,383	5,762	0.9166	0.9283
100,001	8	8,670,469	8,622,350	2,752,943	2,737,665	1,514,122	1,518,041	12,391	5,745	0.8662	0.8773
100,001	9	29,519	29,338	11,489	11,419	5,066	5,080	45	20	0.6949	0.7041
102,001	5	53,277	53,277	4,332	4,332	8,828	8,828	0	35	3.1836	3.2050
102,001	7	3,710,376	3,704,371	1,778,847	1,775,968	723,683	724,141	1,632	2,468	0.6369	0.6456
102,001	8	30,674,456	30,624,308	10,861,462	10,843,705	5,644,083	5,647,919	13,085	20,405	0.8136	0.8242
102,001	9	1,936	1,932	1,349	1,347	338	338	1	1	0.3919	0.3974
104,001	5	12,363	12,363	32,529	32,529	2,142	2,142	0	8	0.1029	0.1044
104,001	6	206,422	206,422	51,839	51,839	18,956	18,956	0	138	0.5712	0.5782
104,001	7	80,941,610	79,608,640	30,712,576	30,206,792	15,922,408	16,028,062	374,029	53,043	0.8289	0.8398
104,001	8	151,866,128	149,307,422	63,798,639	62,723,732	28,796,259	28,987,024	687,520	99,483	0.7219	0.7315
104,001	9	3,556,139	3,496,476	1,783,057	1,753,141	591,331	596,468	15,315	2,330	0.5315	0.5387
106,001	6	26,777	26,777	73,421	73,421	12,533	12,533	0	18	0.2666	0.2706
106,001	7	30,320	30,320	62,988	62,988	9,036	9,036	0	20	0.2241	0.2274

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
106,001	8	2,139	2,139	6,667	6,667	424	424	0	1	0.0992	0.1007
106,001	9	245	245	649	649	41	41	0	0	0.0992	0.1006
108,001	6	53,117	53,117	129,055	129,055	26,454	26,454	0	35	0.3202	0.3249
108,001	7	82,136	82,136	171,902	171,902	26,121	26,121	0	55	0.2374	0.2408
108,001	8	7,545	7,545	18,264	18,264	1,570	1,570	0	5	0.1342	0.1362
108,001	9	101,551	101,551	165,595	165,595	17,063	17,063	0	68	0.1610	0.1633
110,001	6	41,899	41,899	103,968	103,968	23,800	23,800	0	28	0.3576	0.3628
110,001	7	37,669	37,669	81,318	81,318	12,733	12,733	0	25	0.2446	0.2482
110,001	8	2,051	2,051	6,012	6,012	447	447	0	1	0.1162	0.1179
110,001	9	3,124	3,124	5,780	5,780	587	587	0	2	0.1588	0.1611
112,001	6	34,860	34,860	90,479	90,479	20,499	20,499	0	23	0.3539	0.3591
112,001	7	35,313	35,313	78,856	78,856	12,643	12,643	0	24	0.2505	0.2541
112,001	8	439	439	2,574	2,574	105	105	0	0	0.0635	0.0644
112,001	9	2,174	2,174	4,262	4,262	430	430	0	1	0.1578	0.1601
114,001	6	49,040	49,040	162,481	162,481	29,818	29,818	0	33	0.2867	0.2909
114,001	7	106,418	106,418	219,782	219,782	40,229	40,229	0	71	0.2859	0.2901
114,001	8	9,222	9,222	21,861	21,861	2,472	2,472	0	6	0.1766	0.1792
114,001	9	3,867	3,867	8,790	8,790	766	766	0	3	0.1361	0.1381
116,001	6	14,269	14,269	50,356	50,356	9,389	9,389	0	10	0.2913	0.2956
116,001	7	48,963	48,963	103,389	103,389	19,488	19,488	0	33	0.2945	0.2988
116,001	8	2,837	2,837	7,510	7,510	817	817	0	2	0.1700	0.1725
116,001	9	4,961	4,961	9,285	9,285	1,032	1,032	0	3	0.1736	0.1761
118,001	6	38,488	38,488	108,793	108,793	27,251	27,251	0	26	0.3913	0.3970
118,001	7	116,421	116,421	290,463	290,463	48,667	48,667	0	78	0.2617	0.2656
118,001	8	10,978	10,978	25,118	25,118	3,382	3,382	0	7	0.2103	0.2134

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
118,001	9	3,619	3,619	8,812	8,812	789	789	0	2	0.1399	0.1419
120,001	6	11,139	11,139	43,395	43,395	8,332	8,332	0	7	0.2999	0.3044
120,001	7	41,273	41,273	91,964	91,964	18,079	18,079	0	28	0.3071	0.3116
120,001	8	6,310	6,310	15,620	15,620	2,007	2,007	0	4	0.2007	0.2036
120,001	9	1,568	1,568	3,977	3,977	373	373	0	1	0.1466	0.1488
122,001	6	5,930	5,930	24,664	24,664	4,732	4,732	0	4	0.2997	0.3041
122,001	7	45,121	45,121	102,420	102,420	20,667	20,667	0	30	0.3152	0.3198
122,001	8	3,703	3,703	9,744	9,744	1,289	1,289	0	2	0.2066	0.2096
122,001	9	8,081	8,081	15,558	15,558	2,166	2,166	0	5	0.2175	0.2207
124,001	6	6,746	6,746	29,126	29,126	5,856	5,856	0	4	0.3141	0.3187
124,001	7	136,888	136,888	316,426	316,426	66,805	66,805	0	91	0.3298	0.3346
124,001	8	8,718	8,718	23,479	23,479	3,121	3,121	0	6	0.2077	0.2107
124,001	9	5,761	5,761	13,328	13,328	1,659	1,659	0	4	0.1945	0.1974
126,001	6	2,523	2,523	11,576	11,576	2,291	2,291	0	2	0.3091	0.3137
126,001	7	93,106	93,106	220,758	220,758	48,231	48,231	0	62	0.3413	0.3463
126,001	8	11,637	11,637	30,183	30,183	4,283	4,283	0	8	0.2216	0.2249
126,001	9	3,184	3,184	8,012	8,012	949	949	0	2	0.1850	0.1877
128,001	6	1,614	1,614	7,840	7,840	1,611	1,611	0	1	0.3209	0.3256
128,001	7	125,000	125,000	382,718	382,718	69,753	69,753	0	83	0.2847	0.2889
128,001	8	15,728	15,728	43,433	43,433	6,418	6,418	0	10	0.2308	0.2342
128,001	9	4,924	4,924	13,646	13,646	1,517	1,517	0	3	0.1736	0.1762
130,001	6	429	429	2,186	2,186	459	459	0	0	0.3277	0.3325
130,001	7	64,903	64,903	162,217	162,217	38,814	38,814	0	43	0.3738	0.3793
130,001	8	13,366	13,366	35,892	35,892	5,855	5,855	0	9	0.2548	0.2586
130,001	9	1,820	1,820	5,047	5,047	579	579	0	1	0.1791	0.1818

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
132,001	6	438	438	2,363	2,363	503	503	0	0	0.3327	0.3376
132,001	7	72,308	72,308	238,493	238,493	46,134	46,134	0	48	0.3022	0.3066
132,001	8	10,982	10,982	26,744	26,744	4,920	4,920	0	7	0.2874	0.2916
132,001	9	1,211	1,211	4,396	4,396	385	385	0	1	0.1369	0.1389
134,001	6	137	137	1,463	1,463	167	167	0	0	0.1784	0.1811
134,001	7	81,232	81,232	278,607	278,607	55,077	55,077	0	54	0.3088	0.3134
134,001	8	21,389	21,389	51,365	51,365	10,011	10,011	0	14	0.3044	0.3089
134,001	9	11,208	11,208	26,084	26,084	3,901	3,901	0	7	0.2336	0.2370
136,001	7	34,485	34,485	123,372	123,372	24,761	24,761	0	23	0.3135	0.3181
136,001	8	16,317	16,317	48,846	48,846	8,126	8,126	0	11	0.2599	0.2637
136,001	9	4,162	4,162	10,335	10,335	1,490	1,490	0	3	0.2252	0.2285
138,001	6	246	246	1,587	1,587	357	357	0	0	0.3512	0.3564
138,001	7	50,672	50,672	189,389	189,389	38,411	38,411	0	34	0.3168	0.3215
138,001	8	55,784	55,784	136,131	136,131	28,898	28,898	0	37	0.3316	0.3365
138,001	9	7,508	7,508	20,373	20,373	2,763	2,763	0	5	0.2119	0.2150
140,001	7	16,314	16,314	48,471	48,471	13,182	13,182	0	11	0.4248	0.4311
140,001	8	11,851	11,851	37,311	37,311	6,732	6,732	0	8	0.2818	0.2860
140,001	9	4,823	4,823	12,250	12,250	1,872	1,872	0	3	0.2387	0.2422
142,001	7	230,071	230,071	931,385	931,385	199,708	199,708	0	153	0.3349	0.3399
142,001	8	10,245	10,245	34,123	34,123	6,229	6,229	0	7	0.2852	0.2894
142,001	9	3,205	3,205	8,553	8,553	1,340	1,340	0	2	0.2447	0.2483
144,001	7	31,982	31,982	136,702	136,702	29,041	29,041	0	21	0.3318	0.3368
144,001	8	38,810	38,810	101,194	101,194	24,762	24,762	0	26	0.3822	0.3879
144,001	9	12,146	12,146	28,239	28,239	5,320	5,320	0	8	0.2943	0.2986
146,001	7	466,674	466,674	2,068,332	2,068,332	456,420	456,420	0	311	0.3447	0.3498

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
146,001	8	31,681	31,681	111,025	111,025	20,530	20,530	0	21	0.2888	0.2931
146,001	9	5,034	5,034	13,089	13,089	2,255	2,255	0	3	0.2692	0.2731
148,001	7	3,918	3,918	18,393	18,393	4,028	4,028	0	3	0.3421	0.3472
148,001	8	29,805	29,805	111,503	111,503	21,103	21,103	0	20	0.2956	0.3000
148,001	9	22,758	22,758	58,137	58,137	10,424	10,424	0	15	0.2801	0.2842
150,001	7	424	424	2,077	2,077	457	457	0	0	0.3436	0.3487
150,001	8	10,794	10,794	30,891	30,891	7,967	7,967	0	7	0.4029	0.4088
150,001	9	7,319	7,319	17,504	17,504	3,572	3,572	0	5	0.3188	0.3234
152,001	8	11,435	11,435	46,262	46,262	8,782	8,782	0	8	0.2965	0.3009
152,001	9	7,943	7,943	21,328	21,328	3,956	3,956	0	5	0.2897	0.2940
154,001	7	371	371	1,988	1,988	444	444	0	0	0.3491	0.3543
154,001	8	28,564	28,564	86,566	86,566	22,795	22,795	0	19	0.4113	0.4174
154,001	9	66,602	66,602	175,720	175,720	34,502	34,502	0	44	0.3067	0.3112
156,001	7	263	263	1,476	1,476	334	334	0	0	0.3533	0.3585
156,001	8	15,486	15,486	66,715	66,715	13,288	13,288	0	10	0.3111	0.3157
156,001	9	13,410	13,410	36,369	36,369	7,885	7,885	0	9	0.3387	0.3437
158,001	8	44,213	44,213	196,657	196,657	38,820	38,820	0	29	0.3084	0.3129
158,001	9	38,731	38,731	94,511	94,511	23,550	23,550	0	26	0.3892	0.3949
160,001	7	70	70	434	434	96	96	0	0	0.3458	0.3509
160,001	8	20,976	20,976	68,262	68,262	19,257	19,257	0	14	0.4407	0.4472
160,001	9	10,257	10,257	24,684	24,684	6,544	6,544	0	7	0.4141	0.4202
162,001	8	10,537	10,537	37,156	37,156	10,516	10,516	0	7	0.4421	0.4486
162,001	9	16,727	16,727	48,842	48,842	11,007	11,007	0	11	0.3520	0.3572
164,001	7	374	374	2,549	2,549	563	563	0	0	0.3453	0.3504
164,001	8	15,161	15,161	76,586	76,586	15,586	15,586	0	10	0.3179	0.3226

Exhibit 6-3: Detailed Comparison of Average Annual Cost Responsibility and User Fees Paid by Full-Fee-Paying Vehicles by Declared Weight Class

		Annual VMT		Annual Cost Responsibility		Annual User Fees		Alternative-Fee Difference		Equity Ratio	
Weight Class	Axles	All	Full-Fee	All	Full-Fee Cost	All	Full-Fee	Alternative Fee Difference	Allocated Alternative-Fee Difference	Unadjusted	Alternative-Fee Adjusted
164,001	9	42,732	42,732	126,509	126,509	30,256	30,256	0	28	0.3736	0.3791
166,001	8	3,728	3,728	19,623	19,623	3,982	3,982	0	2	0.3170	0.3217
166,001	9	16,453	16,453	49,934	49,934	12,308	12,308	0	11	0.3850	0.3907
168,001	8	6,442	6,442	35,519	35,519	7,266	7,266	0	4	0.3196	0.3243
168,001	9	43,875	43,875	137,441	137,441	34,136	34,136	0	29	0.3880	0.3937
170,001	8	355	355	2,065	2,065	414	414	0	0	0.3134	0.3180
170,001	9	13,190	13,190	44,619	44,619	10,658	10,658	0	9	0.3731	0.3786
172,001	8	703	703	4,207	4,207	856	856	0	0	0.3178	0.3225
172,001	9	36,661	36,661	114,630	114,630	31,823	31,823	0	24	0.4337	0.4400
174,001	9	46,089	46,089	119,557	119,557	41,389	41,389	0	31	0.5408	0.5487
176,001	8	60	60	380	380	82	82	0	0	0.3363	0.3413
176,001	9	19,564	19,564	66,969	66,969	18,156	18,156	0	13	0.4235	0.4297
178,001	9	83,784	83,784	217,978	217,978	83,618	83,618	0	56	0.5992	0.6080
180,001	9	8,804	8,804	32,144	32,144	9,051	9,051	0	6	0.4398	0.4463
182,001	9	28,111	28,111	77,965	77,965	30,023	30,023	0	19	0.6015	0.6104
184,001	9	67,667	67,667	254,655	254,655	76,330	76,330	0	45	0.4682	0.4751
186,001	9	25,226	25,226	97,761	97,761	29,212	29,212	0	17	0.4668	0.4737
188,001	9	83,054	83,054	239,155	239,155	100,332	100,332	0	55	0.6553	0.6650
190,001	9	13,452	13,452	56,617	56,617	17,058	17,058	0	9	0.4706	0.4776
192,001	9	24,161	24,161	101,237	101,237	31,845	31,845	0	16	0.4914	0.4986
194,001	9	73,530	73,530	217,173	217,173	99,856	99,856	0	49	0.7182	0.7288
196,001	9	32,909	32,909	146,007	146,007	46,666	46,666	0	22	0.4993	0.5067
198,001	9	62,859	62,859	276,423	276,423	91,650	91,650	0	42	0.5179	0.5256
200,001	9	244,602	244,602	443,902	443,902	368,867	368,867	0	163	1.2980	1.3170
		38,969,359,934	37,939,648,847	$1,758,952,545	$1,689,540,356	$1,095,805,454	$1,081,585,620	$25,279,032	$25,279,032		

Recommendations for Changes in Tax Rates

Because light and heavy vehicles pay equitable shares of highway costs in Oregon, there is no constitutional requirement to change user-fee rates for the 2013-15 biennium. This report does not recommend any change that would affect the distribution of revenue burdens between light and heavy vehicles. Should rates be adjusted for other reasons, such as to fund additional highway projects, the proportional burdens on light and heavy vehicles should be maintained.

Within the various classes of heavy vehicles, there are inequities that the legislature could choose to address through changes to the rate structure. In this chapter, we offer alternative rate schedules that, if implemented, would bring about substantially greater equity within heavy vehicle classes without materially changing the total amount of revenue collected from heavy vehicles.

The inequities within heavy vehicle classes may be generalized as follows:

- Vehicles between 10,001 and 26,000 pounds are paying more than their fair share
- Vehicles weighing between 26,001 and 78,000 pounds are paying less than their fair share
- Vehicles with a declared weight of 78,001 to 80,000 pounds (which account for 57 percent of all vehicle miles by vehicles over 26,000 pounds and 44 percent of all heavy vehicle miles) are paying more than their fair share
- Vehicles weighing more than 80,000 pounds are paying less than their fair share

To achieve equity within heavy vehicle classes, several rate schedules would need to be changed. These include the Table A and Table B weight-mile tax rates; the optional flat fee rates for haulers of logs, sand and gravel, and wood chips; and the road use assessment fee applicable to vehicles operated under single-trip, non-divisible load permits at gross weights over 98,000 pounds.

Weight-Mile Tax Table A and Table B Rates

Commercial vehicles operated at declared weights of 26,001 to 105,500 pounds are subject to the weight-mile tax for their Oregon miles of travel. Operators of vehicles with declared weights of 26,001-80,000 pounds pay the statutory Table A rates. Vehicles operated under special annual permits at declared weights of 80,001-105,500 pounds are subject to the statutory Table B rates.[1]

Table A rates are specified for each 2,000-pound declared gross weight increment. The existing rates range from 4.98 cents per mile for vehicles declared at 26,001-28,000 pounds to 16.38 cents per

[1] Under the Oregon weight-mile tax system, a power unit (tractor) can have multiple declared weights, depending on the configuration in which it is being operated (i.e., the number of trailers/semi-trailers the truck or tractor is pulling). Hence, during any given reporting period, portions of a vehicle's miles may be reported under both Table A and Table B.

Exhibit 7-1: Weight-Mile Tax Table A

Declared Weight			Current WMT Rate	Alternative Rate	Difference	Percent Difference
26,001	to	28,000	$0.0498	$0.0660	$0.0162	32.53%
28,001	to	30,000	$0.0528	$0.0676	$0.0148	28.03%
30,001	to	32,000	$0.0552	$0.0692	$0.0140	25.36%
32,001	to	34,000	$0.0576	$0.0708	$0.0132	22.92%
34,001	to	36,000	$0.0599	$0.0725	$0.0126	21.04%
36,001	to	38,000	$0.0630	$0.0742	$0.0112	17.78%
38,001	to	40,000	$0.0654	$0.0760	$0.0106	16.21%
40,001	to	42,000	$0.0677	$0.0778	$0.0101	14.92%
42,001	to	44,000	$0.0702	$0.0796	$0.0094	13.39%
44,001	to	46,000	$0.0726	$0.0815	$0.0089	12.26%
46,001	to	48,000	$0.0749	$0.0834	$0.0085	11.35%
48,001	to	50,000	$0.0774	$0.0854	$0.0080	10.34%
50,001	to	52,000	$0.0803	$0.0874	$0.0071	8.84%
52,001	to	54,000	$0.0833	$0.0895	$0.0062	7.44%
54,001	to	56,000	$0.0864	$0.0916	$0.0052	6.02%
56,001	to	58,000	$0.0900	$0.0938	$0.0038	4.22%
58,001	to	60,000	$0.0941	$0.0960	$0.0019	2.02%
60,001	to	62,000	$0.0990	$0.0983	-$0.0007	-0.71%
62,001	to	64,000	$0.1045	$0.1006	-$0.0039	-3.73%
64,001	to	66,000	$0.1104	$0.1030	-$0.0074	-6.70%
66,001	to	68,000	$0.1183	$0.1054	-$0.0129	-10.90%
68,001	to	70,000	$0.1266	$0.1079	-$0.0187	-14.77%
70,001	to	72,000	$0.1350	$0.1104	-$0.0246	-18.22%
72,001	to	74,000	$0.1427	$0.1130	-$0.0297	-20.81%
74,001	to	76,000	$0.1500	$0.1157	-$0.0343	-22.87%
76,001	to	78,000	$0.1572	$0.1184	-$0.0388	-24.68%
78,001	to	80,000	$0.1638	$0.1210	-$0.0428	-26.13%

mile for vehicles declared at 78,001-80,000 pounds.

To achieve better equity within heavy vehicle classes, Table A rates could be changed to range from 6.60 cents per mile to 12.10 cents per mile, as shown in Exhibit 7-1. These rates are higher than existing rates for lower weights and lower than existing rates for the highest weights and would result in a 22.6 percent reduction in revenue collected from vehicles paying Table A rates.

Table B rates are specified for combinations of 2,000-pound increment and number of axles. The rates are structured so that, at any given declared weight, carriers can qualify for a lower rate by utilizing additional axles. At a declared weight of 98,000 pounds, for example, the per-mile rate for a five-axle vehicle is 23.04 cents and the rate for a six-axle vehicle is 19.02 cents. Thus, by adding an axle, a carrier can reduce his or her tax liability by more than four cents per mile. Current Table B rates range from 12.96 cents per mile for a nine-axle vehicle declared at 82,000 pounds to 23.04 cents per mile for a five-axle vehicle declared at 98,000 pounds. Vehicles declared at over 98,000 pounds must have six or more axles, and vehicles declared at over 100,000 pounds must have seven or more axles.

To achieve better equity within the heavy vehicle classes, Table B rates could be adjusted as shown in Exhibit 7-2.

Optional Flat Fee Rates

Under existing law, carriers hauling qualifying commodities—logs, sand and gravel, and wood chips—have the option of paying monthly flat fees in lieu of the weight-mile tax. There are separate flat fee rates applicable to each of the three different commodity groups. Each rate is set so that carriers paying it should, on average, pay the same amount as they would on a mileage basis. For this reason, flat fee vehicles are treated as full fee vehicles in this study. In past studies flat fee vehicles were classified as alternative fee vehicles.

The existing statutory flat fee rate for carriers transporting logs is $7.59 per 100 pounds of declared combined weight. The comparable rates for carriers transporting wood chips and sand and gravel are $30.65 and $7.53, respectively. These are annual rates that are typically paid in monthly installments. The monthly flat fee applicable to a log truck declared at 80,000 pounds, for example, is $506 (*i.e.*, $7.59 x 800 = $6,072/12 months = $506). This amount must be paid each month the vehicle remains on a flat fee basis, regardless of the number of miles traveled during the month.

The flat fee rates are required to be reviewed biennially and appropriate adjustments presented to each regular legislative session. This review is accomplished through the biennial flat fee studies, the latest of which was completed in September 2012. That study compared flat fee revenues in 2011 to what those vehicles would have paid in weight-mile tax in 2011. Both the flat fee rates and weight-mile rates were increased as of October 1, 2010 as a result of the 2009 Jobs and Transportation Act. Previously, both flat fee rates and weight-mile rates were increased as a result of the OTIA III legislation on January 1, 2004. The 2012 flat fee study found that wood chip haulers reporting on a flat fee basis paid more than they would have on a mileage basis in 2011, while flat fee log haulers and sand and gravel haulers paid less than they would have on a mileage basis.

When paying the weight-mile tax, log haulers are allowed to use a lower declared weight when their trailer is empty and stowed above the tractor unit. We assumed that 50 percent of log-truck miles are with an empty, decked trailer, with a declared weight of 44,000 pounds. Weight-mile taxes apply only to miles on public roads in Oregon, but log trucks may incur some of their miles on logging roads.

The first row in Exhibit 7-3 shows current-law flat-fee rates. The second row shows the flat fee rates necessary to achieve revenue neutrality with current-law weight-mile tax rates with forecasted 2014 vehicle-miles traveled and other assumptions consistent with the highway cost allocation study. The third row shows flat fee rates necessary to achieve revenue neutrality with the weight-mile tax rates recommended in this chapter.

Exhibit 7-2: Weight-Mile Tax Table B

Declared Weight			Axles	Current Rate	Alternative Rate	Difference	Percent Difference
80,001	to	82,001	5	$0.1692	$0.1400	-$0.0292	-17.26%
80,001	to	82,001	6	$0.1548	$0.1350	-$0.0198	-12.79%
80,001	to	82,001	7	$0.1447	$0.1300	-$0.0147	-10.16%
80,001	to	82,001	8	$0.1374	$0.1250	-$0.0124	-9.02%
80,001	to	82,001	9	$0.1296	$0.1200	-$0.0096	-7.41%
82,001	to	84,001	5	$0.1747	$0.1474	-$0.0273	-15.63%
82,001	to	84,001	6	$0.1572	$0.1421	-$0.0151	-9.61%
82,001	to	84,001	7	$0.1470	$0.1369	-$0.0101	-6.87%
82,001	to	84,001	8	$0.1392	$0.1316	-$0.0076	-5.46%
82,001	to	84,001	9	$0.1313	$0.1264	-$0.0049	-3.73%
84,001	to	86,001	5	$0.1799	$0.1552	-$0.0247	-13.73%
84,001	to	86,001	6	$0.1609	$0.1496	-$0.0113	-7.02%
84,001	to	86,001	7	$0.1494	$0.1441	-$0.0053	-3.55%
84,001	to	86,001	8	$0.1409	$0.1386	-$0.0023	-1.63%
84,001	to	86,001	9	$0.1332	$0.1331	-$0.0001	-0.08%
86,001	to	88,001	5	$0.1860	$0.1634	-$0.0226	-12.15%
86,001	to	88,001	6	$0.1643	$0.1575	-$0.0068	-4.14%
86,001	to	88,001	7	$0.1518	$0.1517	-$0.0001	-0.07%
86,001	to	88,001	8	$0.1434	$0.1459	$0.0025	1.74%
86,001	to	88,001	9	$0.1350	$0.1401	$0.0051	3.78%
88,001	to	90,001	5	$0.1932	$0.1721	-$0.0211	-10.92%
88,001	to	90,001	6	$0.1686	$0.1658	-$0.0028	-1.66%
88,001	to	90,001	7	$0.1543	$0.1597	$0.0054	3.50%
88,001	to	90,001	8	$0.1458	$0.1536	$0.0078	5.35%
88,001	to	90,001	9	$0.1374	$0.1475	$0.0101	7.35%
90,001	to	92,001	5	$0.2016	$0.1812	-$0.0204	-10.12%
90,001	to	92,001	6	$0.1734	$0.1746	$0.0012	0.69%
90,001	to	92,001	7	$0.1565	$0.1682	$0.0117	7.48%
90,001	to	92,001	8	$0.1482	$0.1617	$0.0135	9.11%
90,001	to	92,001	9	$0.1398	$0.1553	$0.0155	11.09%
92,001	to	94,001	5	$0.2107	$0.1908	-$0.0199	-9.44%
92,001	to	94,001	6	$0.1782	$0.1838	$0.0056	3.14%
92,001	to	94,001	7	$0.1590	$0.1771	$0.0181	11.38%
92,001	to	94,001	8	$0.1505	$0.1703	$0.0198	13.16%
92,001	to	94,001	9	$0.1417	$0.1635	$0.0218	15.38%
94,001	to	96,001	5	$0.2202	$0.2009	-$0.0193	-8.76%
94,001	to	96,001	6	$0.1836	$0.1935	$0.0099	5.39%
94,001	to	96,001	7	$0.1620	$0.1865	$0.0245	15.12%
94,001	to	96,001	8	$0.1530	$0.1793	$0.0263	17.19%
94,001	to	96,001	9	$0.1439	$0.1722	$0.0283	19.67%
96,001	to	98,001	5	$0.2304	$0.2115	-$0.0189	-8.20%
96,001	to	98,001	6	$0.1902	$0.2037	$0.0135	7.10%
96,001	to	98,001	7	$0.1656	$0.1964	$0.0308	18.60%

(continued on next page)

Exhibit 7-2, continued

96,001	to	98,001	8	$0.1555	$0.1888	$0.0333	21.41%
96,001	to	98,001	9	$0.1464	$0.1813	$0.0349	23.84%
98,001	to	100,001	6	$0.1973	$0.2145	$0.0172	8.72%
98,001	to	100,001	7	$0.1692	$0.2068	$0.0376	22.22%
98,001	to	100,001	8	$0.1584	$0.1988	$0.0404	25.51%
98,001	to	100,001	9	$0.1488	$0.1909	$0.0421	28.29%
100,001	to	102,001	7	$0.1728	$0.2177	$0.0449	25.98%
100,001	to	102,001	8	$0.1620	$0.2093	$0.0473	29.20%
100,001	to	102,001	9	$0.1513	$0.2010	$0.0497	32.85%
102,001	to	104,001	7	$0.1764	$0.2292	$0.0528	29.93%
102,001	to	104,001	8	$0.1656	$0.2204	$0.0548	33.09%
102,001	to	104,001	9	$0.1543	$0.2116	$0.0573	37.14%
104,001	to	106,001	7	$0.1811	$0.2400	$0.0589	32.52%
104,001	to	106,001	8	$0.1692	$0.2300	$0.0608	35.93%
104,001	to	106,001	9	$0.1572	$0.2200	$0.0628	39.95%

Exhibit 7-3: Flat Fee Rates

Rate per 100 lbs. per year	Logs	Sand & Gravel	Wood Chips
Current flat fee rate	$7.59	$7.53	$30.65
Rate to match current weight-mile tax	$8.61	$10.40	$19.15
Rate to match alternative weight-mile tax	$8.35	$12.96	$21.08
Recommended Rate from *Flat Fee Study*	$7.66	$9.68	$27.85

The fourth row shows the rates recommended by ODOT based on the September 2012 *Flat Fee Study*, which used 2011 vehicle miles traveled and different assumptions about the number of miles on public roads in Oregon and the percent of log-truck miles that are unloaded. Specifically, ODOT assumed that 55 percent of log truck miles are with an empty, decked trailer; 85 percent of log truck miles are on public roads in Oregon; and 97 percent of sand and gravel trucks are on public roads in Oregon. This study assumes that 50 percent of log truck miles are empty and that miles are as reported.

However calculated, these recommended rates represent an increase in the statutory rates for log trucks and sand and gravel trucks and a reduction for wood chip trucks. For the purpose of setting flat fee rates in the 2013 legislative session, the rates calculated by ODOT from the *Flat Fee Study* are recommended.

Road Use Assessment Fee Rates

Since 1990, carriers operating vehicles under single-trip, non-divisible load permits at gross weights above 98,000 pounds pay the road use assessment fee. The road use assessment fee takes the place of the weight-mile tax for the loaded portion of non-divisible load hauls. With rare exceptions, the empty back haul portion of these trips is subject to the weight-mile tax and taxed at the vehicle's regular declared weight.

The existing statutory road use assessment fee rate is 7.1 cents per equivalent single-axle load (ESAL) mile of travel. The fees carriers actually pay are contained in a table of per-mile rates expressed in terms of permit gross weight and number of axles. Because of its size, that table is not reproduced in this report. Per-mile rates for loads over 200,000 pounds are calculated from the actual weight on each axle. As with the Table B rates, carriers are charged a lower per-mile fee for the use of additional axles at any given gross weight. This reflects the fact that spreading any given total load over additional axles reduces the amount of pavement damage imposed by that load.

The equity ratio results presented in Chapter 6 suggest that the weight classes above 105,500 pounds are significantly underpaying their responsibility. To increase equity within heavy vehicles, the road use assessment fee rates could be increased to 17.9 cents per ESAL-mile. Doing so would increase revenues from the fee by about 2.5 times.