Highway Cost Allocation Study

2021-2023 Biennium

PREPARED BY

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THE 2021 OREGON HIGHWAY COST ALLOCATION STUDY CONCLUDES THAT:

- Light vehicles (those weighing 10,000 pounds or less) paying all fees (which includes alternative fees) are expected to pay 65.96 percent of state highway user revenues, and heavy vehicles (those weighing more than 10,000 pounds) paying all fees are expected to contribute 34.0 percent during the 2021-23 biennium.
- For the 2021-23 biennium and under existing, current-law tax rates, full-fee-paying light vehicles will contribute 66.34 percent of state highway user revenues and full-fee-paying heavy vehicles, as a group, will contribute 33.66 percent.
- Equity ratios for full-fee-paying vehicles, the ratio of projected payments to responsibilities for vehicles in each class, are 0.9539 for light vehicles and 1.1054 for heavy vehicles. Under existing tax rates and fees, light vehicles are projected to underpay their responsibility by 4.6 percent. Heavy vehicles are projected to overpay by 10.5 percent during the next biennium.
- Equity ratios for the individual heavy vehicle weight classes show some classes are projected to overpay and some to underpay their responsibility during the 2021-23 biennium. Chapter 7 offers alternative fee schedules that would minimize this cross-subsidization of some heavy vehicle weight classes by others.
- The legislature recently proposed incremental rate increases for tax rates and fees between 2018 and 2024, which are mostly, but not fully accounted for in this study. These rate increases may impact equity ratios between light and heavy vehicles and should be assessed using the HCAS model.
- Recent changes in economic conditions from the COVID-19 pandemic, have affected the forecasts of miles traveled. Additionally, the projected spending attributable to light vehicles relative to the projected user fees generated for that class have increased the inequity between light and heavy vehicles.
- Should the Legislature choose to modify user fee rates for other reasons beyond the scope of this study, the HCAS model can be used to design those rates to ensure those rates produce revenues in proportion to expected costs imposed by light and heavy vehicles.

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CHAPTER 1: INTRODUCTION AND BACKGROUND

INTRODUCTION

For more than 70 years, Oregon has based the financing of its highways on the principle of cost responsibility. 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. The State of Oregon uses the cost allocation process to apportion costs of highway work to vehicles that impose those costs.

This tradition has served Oregon well by ensuring that the state's highway taxes and fees are levied in a fair and equitable manner. The State of Oregon commissions periodic studies 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, 20 such studies had been completed; the first in 1937, the most recent in 2019.

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 2021 Oregon Highway Cost Allocation Study (HCAS) is to:

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

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

BACKGROUND

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. The State of Oregon completed studies in 1937, 1947, 1963, 1974, 1980, 1984, 1986, 1990, 1992, 1994, and 1999-2019. As noted above, the Oregon Constitution requires that a study is 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 equivalent and used interchangeably in this report.[1]

In this study 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

[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 2009-2011 biennium, was to our knowledge the first state-level study to estimate and allocate the actual costs of highway use.

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 several 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, and 2005 through 2019 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 through 2019 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 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, several 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 88 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 based on each class's relative travel, they are primarily the responsibility of automobiles and other light vehicles. Therefore, it is not surprising that the California studies find a higher light vehicle responsibility 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 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]

[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 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.

OREGON ROAD USER TAXATION

Oregon governs the State Highway Fund using the concept of cost responsibility. The State collects a fair share of revenue from each highway user class through three highway user taxes. The three taxes are: **vehicle registration fees, motor vehicle fuel taxes** (primarily the gasoline tax), and **motor carrier fees** (primarily the weight-mile tax).

REGISTRATION FEE

The registration fee is levied on a biennial basis for all road users, based on the type and weight of the vehicle being registered. The registration fee is 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.

Road user taxes were initially levied against motor vehicles to cover the cost of registration. A one-time fee of $3.00 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.

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. This shift to 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. In 2018, the legislature increased the biennial registration rates for automobiles from $86 to $112. Starting in 2020, additional registration fees were based on the fuel efficiency of registered vehicles, with increasing fees for high-efficiency vehicles.

FUEL TAX

The fuel tax applies to gasoline or diesel fuel purchased from an authorized seller who collects the taxes at the time of sale. 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, 2018 the Oregon Legislature increased the fuel tax and use tax rates to $0.34. The rates are expected to increase by $0.02 in 2020, 2022, and 2024.

MOTOR CARRIER FEES

The primary motor carrier fee is the weight-mile tax, which applies to all commercial motor vehicles with declared gross weights of more than 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 1947, the State has adjusted the weight-mile rates 15 times based on the results of updated cost responsibility studies or the passage of transportation funding packages. The most recent adjustment occurred on January 1, 2018 when HB 2017 increased weight-mile rates by an average of 31 percent across all weight classes.

Other recent revisions to the weight-mile rates include:

- October 1, 2010, when weight-mile rates increased by an average of 24.5 percent because of the 2009 Jobs and Transportation Act (JTA).
- January 1, 2004, when the 2003 Legislature increased weight-mile rates by 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 12.3 percent to reflect the results of the 1999 Study.

- In January 1, 1996, the rates were also reduced by 6.2 percent based on the results of the 1994 Study.
- Rates were also 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 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.

For 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.

Carriers hauling non-divisible loads at gross weights greater than 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 based on a charge of 9.3 cents per equivalent single axle load (ESAL)[4] mile of travel as of January 1, 2020. As with the Table B rates, carriers are assessed a lower per-mile charge the 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.

Each biennium, ODOT conducts a study to test for the revenue neutrality of flat-fee rates and recommends adjustments to those rates as necessary to treat intrastate and interstate carriers equitably.

ORGANIZATION OF THIS REPORT

This volume of the 2021 Study provides an overview of the study issues, methodology, and results, as well as recommendations for future studies. There are several 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 2021 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 2021 Study, including the analysis periods, road (highway) systems, revenues attributed to vehicle classes, and expenditures allocated to those 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.

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

- **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 2015-2019 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:

Appendix A. Glossary of terms

Appendix B. Summary of highway cost-allocation studies in other states

Appendix C. The minutes of each SRT meeting

Appendix D. HCAS model user guide

Appendix E. HCAS model reference guide

Appendix F. 2019 input data and assumptions

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CHAPTER 2: SUMMARY OF THE BASIC STRUCTURE AND PARAMETERS OF STUDY

The underlying approach and methods used in this highway cost allocation study are, with a few major exceptions, like those used in the last six Oregon studies. The analytical framework and basic parameters of the 2021 Study are briefly summarized below.

STUDY APPROACH

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.

GENERAL METHODOLOGY

This section describes key assumptions and data sources for the analysis.

Analysis Periods

- **Base Year:** Calendar year 2019, the most recent full year for which data were available when the study was undertaken.
- **Forecast Year:** Calendar year 2022, the middle 12 months of the 24-month study biennium.
- **Study Period:** The 2021-23 State Fiscal Biennium, or July 1, 2021 to June 30, 2023.

The expenditures allocated in this study are those projected for the 2021-23 biennium using ODOT's Cash Flow Forecast model. All traffic data used in the study were first developed from data for the 2019 base year, and then projected forward to the 2021 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 14 functional classes, which are defined as combinations of urban or rural and seven classifications based on the purpose of the road:

1. Interstate Freeways
2. Other Freeways and Expressways
3. Other Principal Arterials
4. Minor Arterials
5. Major Collectors
6. Minor Collectors
7. Local Streets and Roads

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 14 federal functional classes, we developed three other categories to facilitate the allocation of costs for projects on multiple functional classes. The additional categories are: all roads, all state-owned roads, and all locally-owned roads.

VEHICLE CLASSES

Light vehicles include all vehicles up to 10,000 pounds gross weight, consistent with Oregon law and registration fee schedules. In studies prior to 2007, light vehicles were defined as 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 various times and may have different declared weights for different configurations.

For modeling purposes, each weight class up to 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, which are collected and supplied by ODOT.

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

The study team determined the various weight classes based on 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, most of these vehicles are two-axle, single-unit trucks or buses used in local commercial delivery operations or passenger transport. Thus, they have similar characteristics with respect to their cost responsibility and tax payments. 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 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 to vehicle weight classes, 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 through 2019 studies. Thus, expenditures of bond revenues that were allocated in the most recent prior 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 (also called system development charges). These revenue sources 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 are not interchangeable. This approach has been used to allocate local government expenditures since the 2005 Study.

Expenditure Categories

The four major expenditure categories used for the 2021 Study are:

- **Modernization (new construction or reconstruction).** Examples include adding lanes and straightening curves. Modernization adds to the capacity of a roadway either directly or by improving throughput. 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 does not add to its capacity. A replacement bridge that does not add capacity is considered preservation.
- **Maintenance and Operations.** Examples of maintenance include pot-hole patching, pavement striping, snow and ice removal, and bridge maintenance. Examples of operations include traffic signals, signage, and lighting.
- **Administration, Revenue Collection, Planning, and Other Costs**. Within each of these major categories, expenditures are further broken down into several 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 TO VEHICLES

The revenues attributed to vehicles are based on forecasted collections for the 2021-23 biennium by major state revenue source under the existing tax structure and current-law tax rates (i.e., current registration and title fees, fuel tax, weight-mile tax, flat fee, and road use assessment fee rates).

Because non-state funding sources are included as expenditures, the total expenditures allocated is larger than the amount of total revenues attributed. 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).

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CHAPTER 3: GENERAL METHODOLOGY AND STUDY APPROACH

This chapter presents the general methodology and approach used in the 2021 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 between identical-appearing vehicles or individuals and for the same vehicle or person at various 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.[5] This cost is a common responsibility of all vehicles and is assigned to all classes based on each class's share of total vehicle miles traveled (VMT).

[5] 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 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.

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 based on 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, the cost of the fourth increment to vehicles having gross weights over 80,000 pounds, and the cost of the fifth and final increment to vehicles having gross weights over 105,500 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 consider the effects of climate, traffic levels, mix of vehicle types, and the interactions between different mechanisms.

Roger Mingo adapted the pavement model to use Oregon's special weighing data[6] 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 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).

An updated 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 2011 through 2019, and 2021 Oregon Studies. Like the development of pavement factors for past studies, pavement factors were developed by 2,000-pound increments of declared vehicle weight. Weigh-in-motion (WIM) data were also used to construct distributions of configurations and declared weights by operating weight. The 2011 Oregon Highway Cost Allocation Study was the first study to use the updated 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 which allocator is most appropriate.

Wear-related costs are a direct, empirically established consequence of use by vehicles, and are the easiest cost to allocate. The amount of wear a vehicle imposes per mile of travel 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 are 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.
- When a detailed model for attributing wear-related costs does not exist, this analysis uses allocation factors based on how wear is expected 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.

[6] Special weighings, which are no longer conducted, record the weight of every truck passing the scale, even if empty. Weights were reported for each axle grouping, along with the number of axles in the group. These data replaced the more generalized assumed distributions of operating weight and vehicle configurations used in the national model. The 2010 version of NAPCOM, and Oregon HCAS studies since 2011 use weigh-in-motion data, which record the weight on each axle and the distances between axles for every truck passing each of many sensors around the state.

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 costs, 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 several types of vehicles, 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 consider 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 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 consider 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 based on 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 enough 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 several 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 vehicle use, rather than the existence of vehicles, that imposes costs on the highway system, many 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.

EXHIBIT 3-1: ALLOCATORS APPLIED TO EACH WORK TYPE

Work Type Description	Work Type	Allocator 1	Share 1	Allocator 2	Share 2
Preliminary and Construction Engineering (and etc.)	1	CongestedPCE	0.5595	Other_Construction	0.4405
Right of Way (and Utilities)	2	CongestedPCE	0.7375	Other_Construction	0.2625
Grading and Drainage	3	CongestedPCE	1.0000	None	0.0000
New Pavements-Rigid	4	CongestedPCE	0.0410	Rigid	0.9590
New Pavements-Flexible	5	CongestedPCE	0.0548	Flex	0.9452
New Shoulders-Rigid	6	CongestedPCE	1.0000	None	0.0000
New Shoulders-Flexible	7	CongestedPCE	1.0000	None	0.0000
Pavement and Shoulder Reconstruction-Rigid	8	CongestedPCE	0.0410	Rigid	0.9590
Pavement and Shoulder Reconstruction-Flexible	9	CongestedPCE	0.0548	Flex	0.9452
Pavement and Shoulder Rehab-Rigid	10	All_VMT	0.0410	Rigid	0.9590
Pavement and Shoulder Rehab-Flexible	11	All_VMT	0.0548	Flex	0.9452
Culverts	12	All_VMT	0.8752	Flex	0.1248
New Structures	13	None	1.0000	None	0.0000
Replacement Structures	14	None	1.0000	None	0.0000
Structures Rehabilitation	15	None	1.0000	None	0.0000
Climbing Lanes	16	UphillPCE	1.0000	None	0.0000
Truck Weight/Inspection Facilities	17	Over_26_VMT	1.0000	None	0.0000
Truck Escape Ramps	18	Over_26_VMT	1.0000	None	0.0000
Interchanges	19	None	1.0000	None	0.0000
Roadside Improvements	20	All_VMT	1.0000	None	0.0000
Safety Improvements	21	CongestedPCE	1.0000	None	0.0000
Traffic Service Improvements	22	CongestedPCE	1.0000	None	0.0000
Other Construction (modernization)	23	Other_Construction	1.0000	None	0.0000
Other Construction (preservation)	24	Other_Construction	1.0000	None	0.0000
Surface and Shoulder Maintenance-Rigid	25	All_VMT	0.0410	Rigid	0.9590
Surface and Shoulder Maintenance-Flexible	26	All_VMT	0.0548	Flex	0.9452
Surface and Shoulder Maintenance-Other	27	All_AMT	1.0000	None	0.0000
Drainage Facilities Maintenance	28	All_VMT	1.0000	None	0.0000
Structures Maintenance	29	All_VMT	1.0000	None	0.0000
Roadside Items Maintenance	30	All_VMT	1.0000	None	0.0000
Safety Items Maintenance	31	All_VMT	1.0000	None	0.0000
Traffic Service Items Maintenance	32	CongestedPCE	1.0000	None	0.0000
Pavement Striping and Marking (maintenance)	33	All_AMT	1.0000	None	0.0000
Sanding and Snow and Ice Removal (maintenance)	34	All_VMT	1.0000	None	0.0000
Extraordinary Maintenance	35	All_VMT	1.0000	None	0.0000
Truck Scale Maintenance-Flexible	36	Over_26_VMT	1.0000	None	0.0000
Truck Scale Maintenance-Rigid	37	Over_26_VMT	1.0000	None	0.0000
Truck Scale Maintenance-Buildings and Grounds	38	Over_26_VMT	1.0000	None	0.0000
Studded Tire Damage	39	Basic_VMT	1.0000	None	0.0000
Miscellaneous Maintenance	40	All_VMT	1.0000	None	0.0000
Bike/Pedestrian Projects	41	All_VMT	1.0000	None	0.0000

EXHIBIT 3-1: ALLOCATORS APPLIED TO EACH WORK TYPE (CONTINUED)

Work Type Description	Work Type	Allocator 1	Share 1	Allocator 2	Share 2
Railroad Safety Projects	42	All_VMT	1.0000	None	0.0000
Transit and Rail Support Projects	43	CongestedPCE	1.0000	None	0.0000
Fish and Wildlife Enabling Projects	44	All_VMT	1.0000	None	0.0000
Highway Planning	45	All_VMT	1.0000	None	0.0000
Transportation Demand & Transportation System Management	46	CongestedPCE	1.0000	None	0.0000
Multimodal	47	CongestedPCE	1.0000	None	0.0000
Reserve Money, Fund Exchange, Immediate Opportunity Fund	48	All_VMT	1.0000	None	0.0000
Seismic Retrofits on Structures	49	All_VMT	1.0000	None	0.0000
Other Common Costs	50	All_VMT	1.0000	None	0.0000
Other — Over 26,000 Only	55	Over_26_VMT	1.0000	None	0.0000
Other — Basic Only	56	Basic_VMT	1.0000	None	0.0000
Other — Over 8,000 Only	57	Over_10_VMT	1.0000	None	0.0000
Other — Under 26,000 Only	58	Under_26_VMT	1.0000	None	0.0000
Other Administration	59	All_VMT	1.0000	None	0.0000
Bridge — All Vehicles Share (no added capacity)	60	All_VMT	1.0000	None	0.0000
Bridge — Over 8,000 Vehicles Share	61	Over_10_VMT	1.0000	None	0.0000
Bridge — Over 50,000 Vehicles Share	62	Over_50_VMT	1.0000	None	0.0000
Bridge — Over 80,000 Vehicles Share	63	Over_80_VMT	1.0000	None	0.0000
Bridge — Over 106,000 Vehicle Share	64	Over_106_VMT	1.0000	None	0.0000
Bridge — All Vehicles Share (added capacity)	65	CongestedPCE	1.0000	None	0.0000
Other Bridge	66	Other_Bridge	1.0000	None	0.0000

Unweighted VMT is the most general measure of system use and is 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 related to traffic volumes.

Weighted 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 several 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 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 factors for different functional classes and 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 these studies are those 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 for 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, except for 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 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 actual 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 study 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 specific projects or purposes. In this study, 22.8 percent of local government expenditures (5.4 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 most unmet needs at that time involved pavement rehabilitation and maintenance, items for which heavy vehicles have the predominant responsibility.

There are convincing 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 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 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 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 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 several 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 is 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 was 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 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 based on relative vehicle miles had the effect of increasing the light vehicle responsibility share and reducing the heavy vehicle share.

Beginning with the 2013 study, the Study Review Team recommended that the alternative-fee difference be reported, but that the results be calculated for full-fee paying vehicles only, without any adjustment related to alternative-fee paying vehicles.

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. The 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 this study, we assume that evasion of the weight-mile tax is equal to 5.0 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.

TYPES OF DATA

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

- **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: Model Reference Guide.

The remainder of this chapter presents the traffic, expenditure, and revenue data used in the 2021 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 2019 base year, the latest year for which complete historical data were available. These data were then projected forward to calendar year 2022, the middle 12 months of the 2021-23 fiscal biennium, which is the study period.

The base year traffic data were obtained from several sources. These include ODOT Motor Carrier Transportation Division (MCTD) weight-mile tax information, Highway Performance Monitoring System (HPMS) submittals, MCTD and Driver & Motor Vehicle Services vehicle registrations data, and the Weigh-In-Motion data. For each road system used in the study, travel estimates are developed for light vehicles and each 2,000-pound heavy-vehicle 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 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 and FHWA Highway Statistics data are used to spread VMT to functional classifications.

EXHIBIT 4-1: CURRENT AND FORECASTED VMT BY WEIGHT GROUP (MILLIONS OF MILES)

Declared Weight in Pounds			2019 VMT (estimate)	2022 VMT (forecast)	Avg. Annual Growth Rate
1	to	10,000	33,100	32,048	-1.1%
10,001	to	26,000	958	961	0.1%
26,001	to	78,000	433	408	-2.0%
78,001	to	80,000	1,229	1,166	-1.7%
80,001	to	104,000	242	233	-1.2%
104,001	to	105,500	306	316	1.1%
105,501	and	up	3	3	-1.4%
		Total	**36,271**	**35,135**	**-1.1%**
Total by Weight Range					
1	to	10,000	33,100	32,048	-1.1%
10,001	and	up	3,171	3,087	-0.9%
1	to	26,000	34,058	33,009	-1.0%
26,001	and	up	2,213	2,126	-1.3%
% of Total by Weight Range					
1	to	10,000	91%	91%	
10,001	and	up	9%	9%	
1	to	26,001	94%	94%	
26,001	and	up	6%	6%	

Exhibit 4-1 shows that total vehicle travel in Oregon is projected to decrease from 36.3 billion miles in 2019 to 35.1 billion miles in 2022. This represents an average annual decline of about 1.1 percent. Light vehicle travel is projected to decline from 33.1 billion miles in 2019 to 32.1 billion miles in 2022, which also represents an average annual decline of 1.1 percent. Total heavy vehicle travel (10,001 pounds or greater) is forecasted to decline from 3.2 billion miles in 2019 to 3.1 billion miles in 2022, for an average annual decline of 0.9 percent. These projections are based on the projections from ODOT's revenue forecast model.

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. The current decline in VMT is primarily related to the COVID-19 pandemic, which led to a dramatic decline in economic activity. Although VMT is expected to return to growth in the next few years, the distribution of VMT will depend on how commuting patterns, preferences for travel modes, and reliance on delivery trucks for e-commerce change over time. Given the rapid changes in behavior during 2020, expectations about future preferences may not be clearly represented in the underlying data.

Exhibit 4-1: also shows that the growth projected for heavy vehicle travel varies by weight group. The fastest growth among the heavy vehicle weight classes, 1.1 percent, is expected to be in the 104,001 to 105,500-pound weight class group, though still represents a small share of overall VMT for heavy trucks.

EXHIBIT 4-2: PROJECTED 2020 VMT BY ROAD SYSTEM (MILLIONS OF MILES)

Road System	Total VMT	VMT by VC		Percent of Total VMT	
		Light	Heavy	Light	Heavy
State Roads	21,476	19,062	2,414	88.8%	11.2%
Urban Interstate	5,630	5,057	573	89.8%	10.2%
Rural Interstate	3,972	3,125	847	78.7%	21.3%
Urban Other	5,971	5,650	321	94.6%	5.4%
Rural Other	5,904	5,230	674	88.6%	11.4%
Local Roads	13,553	12,887	666	95.1%	4.9%
County Roads	6,484	6,098	385	94.1%	5.9%
City Streets	7,070	6,789	281	96.0%	4.0%
State & Local Roads	35,029	31,950	3,080	91.2%	8.8%
Federal Roads	106	98	8	92.8%	7.2%
Total All Roads	**35,135**	**32,048**	**3,087**	**91.2%**	**8.8%**

Note: Light includes all vehicles 10,000 pounds & under. Heavy includes all vehicles over 10,000 pounds.

Exhibit 4-2: shows the distribution of projected 2022 travel between light and heavy vehicles for different combinations of road system and ownership. Although light vehicles are projected to account for 91.2 percent and heavy vehicles 8.8 percent of total statewide VMT, the mix of traffic varies significantly among the different road systems. Within that distribution of total VMT, heavy vehicles are expected to account for 11.2 percent of the overall travel on state roads and 4.9 percent of the travel on local roads.

EXHIBIT 4-3: DISTRIBUTION OF PROJECTED 2020 VMT BY ROAD SYSTEM

Road System	Percent of Total VMT	Percent of Total VMT	
		Light	Heavy
State Roads	61.1%	59.5%	78.2%
Urban Interstate	16.0%	15.8%	18.5%
Rural Interstate	11.3%	9.8%	27.4%
Urban Other	17.0%	17.6%	10.4%
Rural Other	16.8%	16.3%	21.8%
Local Roads	38.6%	40.2%	21.6%
County Roads	18.5%	19.0%	12.5%
City Streets	20.1%	21.2%	9.1%
State & Local Roads	99.7%	99.7%	99.8%
Federal Roads	0.3%	0.3%	0.2%
Total All Roads	**100.0%**	**100.0%**	**100.0%**

Exhibit 4-3 illustrates the separate distributions of projected VMT by road system for light vehicles, heavy vehicles, and all vehicles. As shown, 59.5 percent of total travel in the state is expected to be on state highways and 40.2 percent on local roads and streets. The distribution of VMT, however, differs significantly for light versus heavy vehicles across road systems.

Rural interstate highways, for example, are projected to handle 11.3 percent of total VMT in 2022 but 27.4 percent of heavy vehicle VMT. At the other extreme, 20.1 percent of light vehicle travel, but only 9.1 percent of heavy vehicle travel, is forecast to be on city streets. State highways are expected to handle about 59.5 percent of total travel by light vehicles and 78.2 percent of travel by heavy vehicles.

EXHIBIT 4-4: COMPARISON OF FORECAST VMT USED IN PRIOR OR HCASs (BILLIONS OF MILES)

	2011 Study		2013 Study		2015 Study		2017 Study		2019 Study		2021 Study	
Road System	2012 VMT	% of Total	2014 VMT	% of Total	2016 VMT	% of Total	2018 VMT	% of Total	2020 VMT	% of Total	2022 VMT	% of Total
State Roads	23.4	61.7%	23.8	62.0%	21.3	59.4%	21.5	61.3%	22.4	60.1%	22.1	67.8%
Urban Interstate	5.0	13.2%	5.5	14.4%	4.9	13.6%	5.6	16.1%	5.8	15.6%	5.8	17.8%
Rural Interstate	4.8	12.7%	4.8	12.6%	4.5	12.7%	4.0	11.3%	4.0	10.8%	4.1	12.6%
Urban Other	5.7	15.1%	5.8	15.2%	5.0	14.0%	6.0	17.0%	6.6	17.6%	6.1	18.8%
Rural Other	7.8	20.6%	7.6	19.8%	6.9	19.2%	5.9	16.9%	6.1	16.2%	6.1	18.6%
Local Roads	14.6	38.3%	14.6	38.0%	14.6	40.6%	13.6	38.7%	14.9	39.9%	10.5	32.2%
County Roads	7.0	18.4%	7.0	18.2%	7.3	20.2%	6.5	18.5%	8.5	22.7%	4.5	13.7%
City Streets	7.6	19.9%	7.6	19.7%	7.3	20.4%	7.1	20.2%	6.4	17.2%	6.0	18.5%
Total All Roads	**38.0**	**100.0%**	**38.3**	**100.0%**	**35.9**	**100.0%**	**35.0**	**100.0%**	**37.3**	**100.0%**	**32.6**	**100.0%**

Note: VMT on Federally-owned roads not included in Totals.

Exhibit 4-4 compares the VMT projections by road system used in the 2011 through 2021 studies. It shows a general decline in the share of VMT that is on rural road systems and a corresponding increase in the share of VMT on urban roads. The systems projected to account for the largest shares of total statewide travel are Other State Urban Highways and Local City Streets.

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 interchangeable with state funds, and because the proportion of federal funds used for any 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 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 several sources. Data from ODOT's monthly Budget and Cash Flow Forecast were used to develop projected construction expenditures by project for 2021-23 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 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 2020 Local Roads and Streets Survey combined with information from ODOT's Agency Request Budget.

EXHIBIT 4-5: ANNUAL EXPENDITURES BY CATEGORY AND FUNDING SOURCE (THOUSANDS OF DOLLARS)

Major Expenditure Category	All Funding Sources	Funds by Source				Percent of All Funding Sources				All Funding Sources	Percent of Source			
		State	Federal	Local	Bond	State	Federal	Local	Bond		State	Federal	Local	Bond
Modernization	269,446	95,539	149,953	23,953	0	35.5%	55.7%	8.9%	0.0%	13.9%	9.1%	19.6%	19.9%	0.0%
Preservation	258,939	52,033	195,738	11,167	0	20.1%	75.6%	4.3%	0.0%	13.4%	5.0%	25.6%	9.3%	0.0%
Maintenance	443,002	334,053	65,785	43,164	0	75.4%	14.8%	9.7%	0.0%	22.9%	31.9%	8.6%	35.9%	0.0%
Bridge	101,698	22,108	78,186	1,404	0	21.7%	76.9%	1.4%	0.0%	5.3%	2.1%	10.2%	1.2%	0.0%
Other	861,615	544,718	276,326	40,571	0	63.2%	32.1%	4.7%	0.0%	44.5%	52.0%	36.1%	33.7%	0.0%
Total	**1,934,699**	**1,048,451**	**765,988**	**120,260**	**0**	**54.2%**	**39.6%**	**6.2%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**

Exhibit 4-5 presents the average annual expenditures projected for the 2021-23 biennium by major category (modernization, preservation, maintenance, bridge, and other) and funding source (state, federal, local, and bond). As shown, projected expenditures total $1.9 billion. This compares to $1.8 billion annual expenditures allocated in the 2019 study.

Of the $1.9 billion total annual expenditures, $1.1 million (54.2 percent) are projected to be state funded, $766 million (39.6 percent) federally funded, and $120 million (6.2 percent) locally funded. An additional $231.1 million per year of previously-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 many 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 have large federal funds components. About 56 percent of modernization, 75.6 percent of preservation, and 76.9 percent of bridge expenditures will be federally funded. Maintenance expenditures, on the other hand, are largely state-funded, and to a lesser extent, locally funded, with a small federal-funds component. No information about bond expenditures was available for the 2021 study, which is unique compared to prior years.

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 expenditures 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 in this study by $443 million.

The revenue data required for the study are obtained directly from ODOT's revenue forecasting model. The revenue forecast used for this study was the April 2021 forecast. This is a change from previous studies that relied on the December forecast. In the 2019 study, the SRT decided to rely on the updated forecast to ensure that the model is internally consistent with the VMT forecast provided by ODOT. The forecasts include the 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.

EXHIBIT 4-6: REVENUE FORECASTS BY TAX AND FEE TYPE (THOUSANDS OF DOLLARS) AVERAGE ANNUAL AMOUNTS FOR 2021-2023 BIENNIUM

Tax or Fee Type	Forecast Revenue	Percent of Total
Fuel Tax	661,960	44%
Registration Fees	346,004	23%
Title Fees	103,111	7%
Other Motor Carrier Revenue	3,419	0%
Road Use Assessment Fees	3,063	0%
Weight-Mile Tax	373,919	25%
Total	**1,491,477**	**100%**

Average annual state revenues for the 2021-23 biennium are expected to total $1.5 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 $662 million per year (44 percent of total revenues) and weight-mile tax revenue is forecast to average $374 million (25 percent of total revenues). These two sources account for 69 percent of highway user revenues, illustrating that Oregon's system of highway finance is based heavily on taxes and fees related to use of the system.

Revenue from registration and title fees is anticipated to average $346 million annually (23 percent of total revenues), consistent with recent prior studies, but down slightly from the 2019 study. This is primarily due to the 2020 pandemic which offset the registration fee increases. Other revenue sources bring in smaller amounts of revenue.

EXHIBIT 4-7: COMPARISON OF FORECAST REVENUE (MILLIONS OF DOLLARS) USED IN PRIOR OR HCASs

Year of Study	Average Annual Forecast Revenue
1999	691
2001	690
2003	713
2005	826
2007	879
2009	870
2011	1,126
2013	1,096
2015	1,123
2017	1,186
2019	1,482
2021	1,491

Exhibit 4-7 compares the forecasts of average annual total revenues used in the 1999 through 2021 studies. The increase between the 2019 and 2021 studies reflects the increases in the fuel tax, weight-mile tax, and registration fees enacted as by the Oregon Legislature in 2017.

Caution should be used in comparing these forecasts, however, because they were made at various times for different biennia, and they used 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.

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CHAPTER 5: EXPENDITURE ALLOCATION AND REVENUE ATTRIBUTION RESULTS

This chapter presents the expenditure allocation and revenue attribution results of the 2021 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, including those financed by federal, state, and local 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 and later 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), local bond revenues, systems development charges, and traffic impact fees. The 2021 Study uses the same methodology as the 2005 through 2017 studies. As a result, the expenditure allocations in this study are comparable to the 2005 and later 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 67.6 percent and 32.4 percent (respectively) of average annual total expenditures for the 2021-23 biennium.

As shown in the exhibit, the responsibility shares vary significantly among the major expenditure categories. Heavy vehicles, as a group, are projected

EXHIBIT 5-1: AVERAGE ANNUAL COST RESPONSIBILITY BY EXPENDITURE CATEGORY AND WEIGHT CLASS (THOUSANDS OF DOLLARS)

Declared Weight in Pounds			Expenditure Categories						Total
			Modernization	Preservation	Maintenance	Bridge	Other	Prior Bonds	
1	to	10,000	234,400	56,370	255,466	70,494	729,380	118,791	1,464,900
10,001	to	26,000	6,413	23,028	31,095	7,651	19,238	11,814	99,240
26,001	to	78,000	7,637	31,344	40,530	3,110	21,157	10,287	114,065
78,001	to	80,000	11,111	80,989	60,682	11,083	59,805	44,030	267,701
80,001	to	104,000	3,384	22,897	18,875	2,363	12,714	22,169	82,402
104,001	to	105,500	6,163	37,587	33,943	3,081	18,081	22,460	121,315
105,501	and	up	337	6,724	2,411	3,917	1,240	1,791	16,421
		Total	**269,446**	**258,939**	**443,002**	**101,698**	**861,615**	**231,343**	**2,166,043**
Total by Weight Range									
1	to	10,000	234,400	56,370	255,466	70,494	729,380	118,791	1,464,900
10,001	and	up	35,045	202,569	187,536	31,204	132,236	112,553	701,143
1	to	26,001	240,814	79,398	286,561	78,145	748,618	130,605	1,564,140
26,001	and	up	28,632	179,541	156,441	23,553	112,998	100,738	601,903
% of Total by Weight Range									
1	to	10,000	87.0%	21.8%	57.7%	69.3%	84.7%	51.3%	67.6%
10,001	and	up	13.0%	78.2%	42.3%	30.7%	15.3%	48.7%	32.4%
1	to	26,001	89.4%	30.7%	64.7%	76.8%	86.9%	56.5%	72.2%
26,001	and	up	10.6%	69.3%	35.3%	23.2%	13.1%	43.5%	27.8%

to be responsible for much of the preservation expenditure (78.2 percent). That group is responsible for smaller shares of modernization, maintenance, bridge, and other expenditures (13 percent, 42.3 percent, 30.7 percent, and 15.3 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 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.

EXHIBIT 5-2: SOURCES AND EXPENDITURES OF FUNDS (THOUSANDS OF ANNUAL DOLLARS)

Expenditures of Funds	Source of Funds				All Sources
	State Revenues	Bond Revenues	Federal Revenues	Local Revenues	
State Government	817,946	0	731,748	0	1,549,694
Local Governments	230,505	0	34,241	120,260	385,005
Expenditure of Bond Revenue	0	0	0	0	0
Total Expenditures	**1,048,451**	**0**	**765,988**	**120,260**	**1,934,699**
Allocated State Expenditures	817,946	0	731,748	0	1,549,694
Allocated Local Expenditures	230,505	0	34,241	120,260	385,005
Allocated Current Bond	0	0	0	0	0
Allocated Prior Bond	0	231,343	0	0	231,343
Total Allocated Expenditures	**1,048,451**	**231,343**	**765,988**	**120,260**	**2,166,043**

EXHIBIT 5-3: EXPENDITURE ALLOCATION RESULTS FOR WEIGHT GROUPS BY FUNDING SOURCE (THOUSANDS OF DOLLARS)

Funding Source	Avg. Annual Total Expenditures Allocated	Allocation to Vehicles			
		Under 10,001 Pounds	Over 10,000 Pounds	Under 26,001 Pounds	Over 26,000 Pounds
State (Highway Fund)	817,946	634,231	183,715	658,525	159,422
		77.5%	22.5%	80.5%	19.5%
Federal	731,748	504,727	227,021	535,117	196,631
		69.0%	31.0%	73.1%	26.9%
Local	385,005	207,151	177,854	239,894	145,112
		53.8%	46.2%	62.3%	37.7%
Bond	0	0	0	0	0
		0.0%	0.0%	0.0%	0.0%
Current	1,934,699	1,346,109	588,590	1,433,535	501,164
		69.6%	30.4%	74.1%	25.9%
Prior Bond	231,343	118,791	112,553	130,605	100,738
		51.3%	48.7%	56.5%	43.5%
Total	**2,166,043**	**1,464,900**	**701,143**	**1,564,140**	**601,903**
		67.6%	**32.4%**	**72.2%**	**27.8%**

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 77.5 percent of state, 69 percent of federal, and 53.8 percent of local bond expenditures. Heavy vehicles are projected to be responsible for 22.5 percent of state, 31.0 percent of federal, and 46.2 percent of local expenditures. Overall, state-funded expenditures are expected to average $817 million annually over the 2021-23 biennium. Comparable annual amounts for federal, and local expenditures are $732 million and $385 million, respectively.

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

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	47,649	8,565	183,141	13,239	381,637	634,231
10,001	to	26,000	366	2,287	10,161	1,468	10,011	24,294
26,001	to	78,000	227	2,928	8,718	591	14,025	26,488
78,001	to	80,000	904	9,368	29,028	2,247	41,375	82,922
80,001	to	104,000	185	2,548	7,268	450	8,310	18,760
104,001	to	105,500	281	4,052	11,157	582	11,317	27,390
105,501	and	up	15	833	1,883	841	290	3,861
		Total	**49,627**	**30,581**	**251,356**	**19,417**	**466,965**	**817,946**
Total by Weight Range								
1	to	10,000	47,649	8,565	183,141	13,239	381,637	634,231
10,001	and	up	1,978	22,015	68,215	6,178	85,328	183,715
1	to	26,000	48,015	10,852	193,302	14,707	391,648	658,525
26,001	and	up	1,612	19,728	58,054	4,710	75,317	159,422
% of Total by Weight Range								
1	to	10,000	96%	28%	73%	68%	82%	78%
10,001	and	up	4%	72%	27%	32%	18%	22%
1	to	26,000	97%	35%	77%	76%	84%	81%
26,001	and	up	3%	65%	23%	24%	16%	19%

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	133,040	42,746	46,598	54,328	228,016	504,727
10,001	to	26,000	1,486	15,523	1,741	5,634	6,006	30,390
26,001	to	78,000	1,248	19,927	794	2,256	4,749	28,973
78,001	to	80,000	4,448	63,763	2,935	8,566	16,080	95,792
80,001	to	104,000	1,046	17,331	587	1,838	3,642	24,443
104,001	to	105,500	1,628	27,504	774	2,372	5,358	37,636
105,501	and	up	238	5,765	68	2,792	924	9,787
		Total	**143,133**	**192,558**	**53,495**	**77,787**	**264,774**	**731,748**
Total by Weight Range								
1	to	10,000	133,040	42,746	46,598	54,328	228,016	504,727
10,001	and	up	10,093	149,813	6,898	23,459	36,759	227,021
1	to	26,000	134,526	58,268	48,339	59,962	234,021	535,117
26,001	and	up	8,607	134,290	5,156	17,824	30,753	196,631
% of Total by Weight Range								
1	to	10,000	93%	22%	87%	70%	86%	69%
10,001	and	up	7%	78%	13%	30%	14%	31%
1	to	26,000	94%	30%	90%	77%	88%	73%
26,001	and	up	6%	70%	10%	23%	12%	27%

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	53,711	5,059	25,727	2,927	119,727	207,151
10,001	to	26,000	4,561	5,219	19,193	548	3,221	32,742
26,001	to	78,000	6,162	8,490	31,018	264	2,383	48,316
78,001	to	80,000	5,759	7,858	28,719	270	2,350	44,956
80,001	to	104,000	2,153	3,018	11,020	75	762	17,029
104,001	to	105,500	4,254	6,030	22,012	126	1,407	33,829
105,501	and	up	85	126	461	284	26	982
		Total	**76,685**	**35,800**	**138,150**	**4,494**	**129,876**	**385,005**
Total by Weight Range								
1	to	10,000	53,711	5,059	25,727	2,927	119,727	207,151
10,001	and	up	22,974	30,741	112,423	1,567	10,148	177,854
1	to	26,000	58,273	10,277	44,920	3,475	122,949	239,894
26,001	and	up	18,412	25,523	93,231	1,019	6,927	145,112
% of Total by Weight Range								
1	to	10,000	70%	14%	19%	65%	92%	54%
10,001	and	up	30%	86%	81%	35%	8%	46%
1	to	26,000	76%	29%	33%	77%	95%	62%
26,001	and	up	24%	71%	67%	23%	5%	38%

EXHIBIT 5-7: AVERAGE ANNUAL COST RESPONSIBILITY, BOND DETAIL (THOUSANDS OF DOLLARS)

Declared Weight in Pounds			Modernization	Preservation	Maintenance	Bridge	Other	Current	Prior	Total
1	to	10,000	0	0	0	0	0	0	118,791	118,791
10,001	to	26,000	0	0	0	0	0	0	11,814	11,814
26,001	to	78,000	0	0	0	0	0	0	10,287	10,287
78,001	to	80,000	0	0	0	0	0	0	44,030	44,030
80,001	to	104,000	0	0	0	0	0	0	22,169	22,169
104,001	to	105,500	0	0	0	0	0	0	22,460	22,460
105,501	and	up	0	0	0	0	0	0	1,791	1,791
		Total	**0**	**0**	**0**	**0**	**0**	**0**	**231,343**	**231,343**
Total by Weight Range										
1	to	10,000	0	0	0	0	0	0	118,791	118,791
10,001	and	up	0	0	0	0	0	0	112,553	112,553
1	to	26,000	0	0	0	0	0	0	130,605	130,605
26,001	and	up	0	0	0	0	0	0	100,738	100,738
% of Total by Weight Range										
1	to	10,000	0%	0%	0%	0%	0%	0%	51%	51%
10,001	and	up	0%	0%	0%	0%	0%	0%	49%	49%
1	to	26,000	0%	0%	0%	0%	0%	0%	56%	56%
26,001	and	up	0%	0%	0%	0%	0%	0%	44%	44%

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 typically have the effect of reducing the light vehicle responsibility share and increasing the heavy vehicle share.

Conversely, state funds are 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 local streets see a higher proportion of traffic from light vehicles and many types of expenditures are allocated on a relative travel basis.

This factor, however, is partially 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, including rehabilitation, repair, and maintenance of pavements and bridges. In addition, locally owned roads often are less able to withstand the weight of heavy vehicles than are freeways and state highways.

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 Exhibit 5-8 and Exhibit 5-9.

EXHIBIT 5-8. COMPARISON OF PAVEMENT RESPONSIBILITY RESULTS FROM PRIOR OR HCASs (THOUSANDS OF ANNUAL DOLLARS)

Expenditure Work Type	2011 Study		2013 Study			2015 Study			2017 Study			2019 Study			2021 Study		
	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility
New Pavements	10,483	56,768	57,185	9,986	47,199	48,984	7,530	41,454	37,084	3,938	33,146	31,199	5,097	26,103	55,382	7,174	48,209
	15.6%	84.4%	3.6%	17.5%	82.5%	3.4%	15.4%	84.6%	2.5%	10.6%	89.4%	1.7%	16.3%	83.7%	1.3%	15.3%	84.7%
Pavement and Shoulder Reconstruction	7,115	19,844	19,734	3,029	16,705	28,823	4,233	24,590	4,106	384	3,722	1,988	245	1,743	612	57	555
	26.4%	73.6%	1.2%	15.3%	84.7%	2.0%	14.7%	85.3%	0.3%	9.4%	90.6%	0.1%	12.3%	87.7%	0.0%	9.3%	90.7%
Pavement and Shoulder Rehabilitation	36,581	67,112	98,921	24,047	74,874	64,885	11,114	53,771	141,338	14,780	126,558	208,765	26,918	181,847	408,474	39,431	369,043
	35.3%	64.7%	6.2%	24.3%	75.7%	4.5%	17.1%	82.9%	9.4%	10.5%	89.5%	11.5%	12.9%	87.1%	9.4%	9.7%	90.3%
Pavement Maintenance	98,727	151,388	263,624	63,465	200,159	221,898	54,784	167,114	227,903	29,773	198,131	211,770	36,577	175,193	423	329	94
	39.5%	60.5%	16.6%	24.1%	75.9%	15.4%	24.7%	75.3%	15.2%	13.1%	86.9%	11.6%	17.3%	82.7%	0.0%	77.8%	22.2%
Other Pavement Expenditures	22,865	2,586	18,451	16,582	1,869	5,013	4,957	56	5,416	4,434	983	5,883	4,225	1,658	0	0	0
	89.8%	10.2%	1.2%	89.9%	10.1%	0.3%	98.9%	1.1%	0.4%	81.9%	18.1%	0.3%	71.8%	28.2%	0.0%	0.0%	0.0%
Total Pavement Expenditures	**175,771**	**297,699**	**457,914**	**117,109**	**340,805**	**369,604**	**82,618**	**286,986**	**415,848**	**53,308**	**362,539**	**459,605**	**73,062**	**386,544**	**464,279**	**46,990**	**417,901**
	37.1%	**62.9%**	**28.9%**	**25.6%**	**74.4%**	**25.7%**	**22.4%**	**77.6%**	**27.8%**	**12.8%**	**87.2%**	**25.3%**	**15.9%**	**84.1%**	**24.0%**	**10.1%**	**90.0%**

EXHIBIT 5-9: COMPARISON OF BRIDGE AND INTERCHANGE RESPONSIBILITY RESULTS FROM PRIOR OR HCASs (THOUSANDS OF DOLLARS)

Expenditure Work Type	2011 Study		2013 Study			2015 Study			2017 Study			2019 Study			2021 Study		
	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility	Expenditures Allocated	Light Vehicle Responsibility	Heavy Vehicle Responsibility
Bridge and Interchange	64,362	79,930	76,901	49,436	27,466	86,528	54,743	31,785	#REF!	#REF!	#REF!	97,647	59,707	37,940	184,541	124,251	60,289
	44.6%	55.4%	4.8%	64.3%	35.7%	6.0%	63.3%	36.7%	#REF!	#REF!	#REF!	5.4%	61.1%	38.9%	4.3%	67.3%	32.7%
Bridge Maintenance	24,672	2,420	51,490	47,219	4,271	20,064	17,883	2,181	#REF!	#REF!	#REF!	3,533	3,149	384	18,856	16,736	2,119
	91.1%	8.9%	3.2%	91.7%	8.3%	1.4%	89.1%	10.9%	#REF!	#REF!	#REF!	0.2%	89.1%	10.9%	0.4%	88.8%	11.2%
Total Bridge and Interchange Expenditures	**89,034**	**82,350**	**128,391**	**96,655**	**31,737**	**106,592**	**72,626**	**33,966**	**#REF!**	**#REF!**	**#REF!**	**101,180**	**62,856**	**38,324**	**203,396**	**140,988**	**62,409**
	51.9%	**48.1%**	**8.1%**	**75.3%**	**24.7%**	**7.4%**	**68.1%**	**31.9%**	**#REF!**	**#REF!**	**#REF!**	**5.6%**	**62.1%**	**37.9%**	**4.7%**	**69.3%**	**30.7%**

Note: Percents in the Expends. Allocated columns are the share of total expenditures allocated in each study accounted for the expenditures for each pavement work type. Percents in the Light and Heavy Vehicle Responsibility. Columns are the light and heavy vehicle

Exhibit 5-8 shows that pavement expenditures allocated in the 2021 Study total $464.9 million, 1.2 percent more than in the 2019 Study, and 12 percent more than the pavement expenditures allocated in the 2017 Study. The pavement cost responsibility for heavy trucks increased during the 2021 study due to the shift in expenditures toward new pavement and rehabilitation during the study period, a much larger shift in the distribution relative to recent studies.

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 sensitive to the light vehicle pavement factors. In the 2019 study, additional weigh-in-motion data was provided to the study team, which revealed information about the distribution of light vehicles in Oregon. This additional information shifted pavement expenditure allocations toward light vehicles.

Exhibit 5-9 compares the bridge and interchange expenditure amounts and responsibility results in the 2011 through 2021 studies. Bridge-related expenditures more than doubled in the 2021 study but were lower as a share of total expenditures in the current study (4.7 percent) than in the 2019 study, due to the growth of administrative and other non-project expenditures. The expenditure amounts reported in Exhibit 5-9 do not include this study's share of prior biennia's bond expenditures.

The heavy vehicle responsibility share for total bridge plus interchange expenditures in the current study is 30.7 percent, compared to 37.9 percent in the 2019 study, 30.7 percent in the 2017 study, 31.9 percent in the 2015 study, 24.7 percent in the 2013 Study, and 41.8 percent in the 2011 Study. The change since 2011 reflects the results of a new bridge cost allocation study completed for the 2013 study.

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	1,346,109	118,791	1,464,900
10,001	to	26,000	87,426	11,814	99,240
26,001	to	78,000	103,778	10,287	114,065
78,001	to	80,000	223,670	44,030	267,701
80,001	to	104,000	60,232	22,169	82,402
104,001	to	105,500	98,855	22,460	121,315
105,501	and	up	14,629	1,791	16,421
		Total	**1,934,699**	**231,343**	**2,166,043**

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 2021-23 biennium. The 2021 Study will include the same allocated expenditures from the 2011 through 2019 studies, as well as allocated bond expenditures from the current study.

EXHIBIT 5-11: COST RESPONSIBILITY DISTRIBUTIONS BY WEIGHT GROUP-COMPARISON BETWEEN CURRENT AND PRIOR OR HCAS

Declared Weight in Pounds			2019 Study	2021 Study	Change in Percentage
1	to	10,000	65.3%	69.6%	4.3%
10,001	to	26,000	5.1%	3.5%	-1.5%
26,001	to	78,000	5.0%	3.7%	-1.3%
78,001	to	80,000	13.8%	12.8%	-1.0%
80,001	to	104,000	4.2%	3.9%	-0.3%
104,001	to	105,500	5.6%	5.7%	0.1%
105,501	and	up	1.1%	0.8%	-0.3%
		Total	**100.0%**	**100.0%**	
% for Vehicles Over 10,000 lbs			**34.7%**	**30.4%**	**-4.3%**

For illustrative purposes, Exhibit 5-11 compares the expenditure allocation results (with prior allocated costs) for the current study with those of the previous study. As shown, the shares are similar: the all-vehicle responsibility shares in the 2019 Study are 65.3 percent for light vehicles and 34.7 percent for heavy vehicles; the 2021 Study shares are 69.6 percent for light vehicles and 30.4 percent for heavy vehicles.

REVENUE ATTRIBUTION RESULTS

The attribution of revenues to the various vehicle types and weight classes is a principal 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 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 taxes, registration fees, weight-mile tax), 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 revenue forecast upon which the Agency Request Budget is based.

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 and forecasted spending by ODOT, we anticipate that light vehicles will contribute 66 percent of State Highway Fund revenues and heavy vehicles will contribute 34.0 percent. These shares are for all vehicles and differ from the shares for full-fee paying vehicles that are used in the calculation of equity ratios.

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

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	645,015	338,805	0	0	0	0	983,820
10,001	to	26,000	10,461	57,451	0	0	0	0	67,912
26,001	to	78,000	4,362	7,941	28,324	481	6	0	41,115
78,001	to	80,000	1,018	31,694	231,354	2,043	2,544	0	268,653
80,001	to	104,000	317	5,357	40,909	351	5,640	41	52,615
104,001	to	105,500	787	7,721	64,122	537	1,020	28	74,214
105,501	and	up	0	147	0	6	0	2,995	3,147
		Total	**661,960**	**449,115**	**364,709**	**3,419**	**9,210**	**3,063**	**1,491,477**
Total by Weight Range									
1	to	10,000	645,015	338,805	0	0	0	0	983,820
10,001	and	up	16,945	110,310	364,709	3,419	9,210	3,063	507,657
1	to	26,000	655,476	396,256	0	0	0	0	1,051,732
26,001	and	up	6,484	52,860	364,709	3,419	9,210	3,063	439,745
% of Total by Weight Range									
1	to	10,000	97.4%	75.4%	0.0%	0.0%	0.0%	0.0%	66.0%
10,001	and	up	2.6%	24.6%	100.0%	100.0%	100.0%	100.0%	34.0%
1	to	26,001	99.0%	88.2%	0.0%	0.0%	0.0%	0.0%	70.5%
26,001	and	up	1.0%	11.8%	100.0%	100.0%	100.0%	100.0%	29.5%

contribute 97.1 percent of fuel tax revenues and 75.4 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, overdue payment penalties and interest, etc.

EXHIBIT 5-13: REVENUE ATTRIBUTION DISTRIBUTIONS BY WEIGHT GROUP-COMPARISON BETWEEN CURRENT AND PRIOR OR HCAS

Declared Weight in Pounds			2019 Study	2021 Study	Change in Percentage
1	to	10,000	65.6%	66.3%	0.7%
10,001	to	26,000	5.0%	3.9%	-1.2%
26,001	to	78,000	3.2%	2.6%	-0.7%
78,001	to	80,000	18.6%	18.4%	-0.2%
80,001	to	104,000	3.3%	3.6%	0.3%
104,001	to	105,500	4.1%	5.1%	1.0%
105,501	and	up	0.2%	0.2%	0.0%
		Total	**100.0%**	**100.0%**	
% for Vehicles Over 10,000 lbs.			**34.4%**	**33.7%**	**-0.7%**

Exhibit 5-13 compares the revenue attribution results of the current study with those of the 2019 Study. The projected share of revenues contributed by light vehicles has increased from 65.6 percent in the 2019 Study to 66.3 percent in the current study. Conversely, the overall heavy vehicle share of projected payments has decreased from 34.4 percent in the previous study to 33.7 percent in the current study.

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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 based on the relative miles of travel of each in that class.[7]

PRESENTATION OF EQUITY RATIOS

EXHIBIT 6-1: COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Declared Weight in Pounds			Annual VMT			Percent of Annual VMT		
			All	Full-Fee	Alternative Fee	All	Full-Fee	Alternative Fee
1	to	10,000	32,048,024,635	31,315,785,783	732,238,851	91.2%	92.1%	63.9%
10,001	to	26,000	961,352,898	706,497,726	254,855,172	2.7%	2.1%	22.2%
26,001	to	78,000	407,605,715	283,294,868	124,310,847	1.2%	0.8%	10.9%
78,001	to	80,000	1,166,473,343	1,148,852,827	17,620,516	3.3%	3.4%	1.5%
80,001	to	104,000	232,807,892	228,023,805	4,784,087	0.7%	0.7%	0.4%
104,001	to	105,500	315,891,499	304,164,895	11,726,604	0.9%	0.9%	1.0%
105,501	and	up	3,263,629	3,263,629	0	0.0%	0.0%	0.0%
		Total	**35,135,419,611**	**33,989,883,533**	**1,145,536,078**	**100.0%**	**100.0%**	**100.0%**
10,001	and	up	3,087,394,976	2,674,097,750	413,297,226	8.8%	7.9%	36.1%
26,001	to	80,000	1,574,079,058	1,432,147,694	141,931,364	4.5%	4.2%	12.4%
80,001	to	105,500	548,699,391	532,188,700	16,510,691	1.6%	1.6%	1.4%
26,001	to	105,500	2,122,778,449	1,964,336,395	158,442,055	6.0%	5.8%	13.8%
26,001	and	up	2,126,042,078	1,967,600,024	158,442,055	6.1%	5.8%	13.8%

[7] 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.

EXHIBIT 6-1 (CONTINUED): COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Declared Weight in Pounds			Annual Cost Responsibility				Percent of Annual Cost Responsibility			
			State	Federal	Local	Full-Fee	State	Federal	Local	Full-Fee
1	to	10,000	753,021,410	504,726,980	207,151,427	1,431,429,531	71.8%	69.0%	53.8%	69.6%
10,001	to	26,000	36,108,132	30,389,824	32,742,185	72,424,557	3.4%	4.2%	8.5%	3.5%
26,001	to	78,000	36,775,513	28,973,187	48,316,170	76,638,453	3.5%	4.0%	12.5%	3.7%
78,001	to	80,000	126,952,266	95,792,397	44,955,864	263,656,696	12.1%	13.1%	11.7%	12.8%
80,001	to	104,000	40,929,768	24,442,960	17,028,796	80,636,895	3.9%	3.3%	4.4%	3.9%
104,001	to	105,500	49,849,972	37,635,873	33,829,337	116,808,700	4.8%	5.1%	8.8%	5.7%
105,501	and	up	5,652,250	9,786,583	981,712	16,417,673	0.5%	1.3%	0.3%	0.8%
		Total	**1,049,289,311**	**731,747,805**	**385,005,490**	**2,058,012,504**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
10,001	and	up	296,267,901	227,020,825	177,854,063	626,582,974	28.2%	31.0%	46.2%	30.4%
26,001	to	80,000	163,727,779	124,765,584	93,272,034	340,295,149	15.6%	17.1%	24.2%	16.5%
80,001	to	105,500	90,779,740	62,078,833	50,858,132	197,445,594	8.7%	8.5%	13.2%	9.6%
26,001	to	105,500	254,507,519	186,844,417	144,130,167	537,740,743	24.3%	25.5%	37.4%	26.1%
26,001	and	up	260,159,770	196,631,001	145,111,879	554,158,417	24.8%	26.9%	37.7%	26.9%

EXHIBIT 6-1 (CONTINUED): COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Declared Weight in Pounds			Annual User Fees			Annual User Fees		
			All	Full-Fee	Alternative Fee Difference	All	Full-Fee	Alternative Fee Difference
1	to	10,000	983,820,079	967,380,551	6,180,170	65.96%	66.34%	20.0%
10,001	to	26,000	67,912,031	56,164,399	8,377,350	4.6%	3.9%	27.2%
26,001	to	78,000	41,114,546	37,345,330	9,563,350	2.8%	2.6%	31.0%
78,001	to	80,000	268,652,946	267,909,757	3,365,874	18.0%	18.4%	10.9%
80,001	to	104,000	52,615,452	52,424,906	976,136	3.5%	3.6%	3.2%
104,001	to	105,500	74,214,332	73,734,893	2,362,876	5.0%	5.1%	7.7%
105,501	and	up	3,147,354	3,147,349	0	0.2%	0.2%	0.0%
		Total	**1,491,476,739**	**1,458,107,185**	**30,825,757**	**100.0%**	**100.0%**	**100.0%**
10,001	and	up	507,656,660	490,726,634	24,645,586	34.0%	33.66%	80.0%
26,001	to	80,000	309,767,491	305,255,088	12,929,224	20.8%	20.9%	41.9%
80,001	to	105,500	126,829,784	126,159,799	3,339,012	8.5%	8.7%	10.8%
26,001	to	105,500	436,597,275	431,414,886	16,268,237	29.3%	29.6%	52.8%
26,001	and	up	439,744,629	434,562,235	16,268,237	29.5%	29.8%	52.8%

EXHIBIT 6-1: (CONTINUED): COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Declared Weight in Pounds			Scaled Equity Ratio		Share of Cost	
			All	Full-Fee	All	Full-Fee
1	to	10,000	0.9753	0.9539	67.6%	69.6%
10,001	to	26,000	0.9938	1.0945	4.6%	3.5%
26,001	to	78,000	0.5235	0.6878	5.3%	3.7%
78,001	to	80,000	1.4574	1.4342	12.4%	12.8%
80,001	to	104,000	0.9273	0.9176	3.8%	3.9%
104,001	to	105,500	0.8884	0.8910	5.6%	5.7%
105,501	and	up	0.2784	0.2706	0.8%	0.8%
		Total	**1.0000**	**1.0000**	**100.0%**	**100.0%**
10,001	and	up	1.0515	1.1054	32.4%	30.4%
26,001	to	80,000	1.1784	1.2661	17.6%	16.5%
80,001	to	105,500	0.9042	0.9018	9.4%	9.6%
26,001	to	105,500	1.0830	1.1324	27.0%	26.1%
26,001	and	up	1.0610	1.1068	27.8%	26.9%

Exhibit 6-1 includes calculated equity ratios for the summary-level weight groups shown in earlier exhibits. As shown in the first table within Exhibit 6-1, projected 2022 vehicle miles traveled (VMT) for full-fee-paying vehicles are 34 billion, 92.1 percent of these miles being traveled by light vehicles and 7.9 percent by heavy vehicles. This compares to projected 2022 miles of travel by all vehicles of 35.2 billion, 91.2 percent by light vehicles and 8.8 percent by heavy vehicles.

Exhibit 6-2 at the end of this chapter, shows the equity ratios for each 2,000-pound weight class. **These equity ratios are for full-fee-paying vehicles only and exclude vehicles that pay on an alternative-fee basis.**

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-share of VMT, in other words, will always be 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 $2.1 billion per year, with responsibility shares of 69.6 percent for light vehicles and 30.4 percent for heavy vehicles. This compares to the projected total responsibility for all vehicles of $2.2 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 $1.46 billion, 66.34 percent from light vehicles and 33.66 percent from heavy vehicles. The difference between this total and the $1.49 billion for all vehicles represents projected revenues from alternative-fee-paying vehicles.

The total of the 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 $30.8 million annually for the next biennium under existing tax rates.[8] Beginning with the 2013 study, equity ratios are calculated using allocated costs and attributed revenues for full-fee paying vehicles only.

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.[9]

This study finds full-fee equity ratios of .9539 for light vehicles and 1.1054 for heavy vehicles as a group. This means that, for the 2021-23 biennium, under the existing tax structure and rates, light vehicles are expected to underpay their fair share by 4.6 percent and heavy vehicles are expected to overpay by 10.5 percent under the existing tax rates and relative to the projected distribution of project spending.

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 9.5 percent. Vehicles with weights between 26,001 and 78,000 pounds as a group underpay their fair share by 31.2 percent and those between 78,001 and 80,000 pounds overpay by 43.4 percent.

[8] 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.

[9] 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.

Vehicles in the 78,001 to 80,000-pound class alone account for 43.0 percent of the VMT by full-fee-paying heavy vehicles and 58.4 percent of the VMT by full-fee-paying vehicles over 26,000-pounds. These vehicles also account for 42.2 percent of the cost responsibility and 48.7 percent of the user fees paid by full-fee-paying heavy vehicles. The reason for the difference in the equity ratio between this group and the groups above and below it is that most truckers who can operate 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 9.8 percent less than their fair share. Those in the 104,001 to 105,500 range pay 10.9 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 72.9 percent. This is consistent with underpayment levels found in previous studies. 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 pre-2005 studies.

COMPARISON WITH PREVIOUS OREGON STUDIES

Overall, the heavy and light equity ratios found by this study align with those ratios determined in previous Oregon studies (see Exhibit 6-2). 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. Consequently, 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 subsequent studies indicate that they succeeded.

The 2011-2019 Studies found adjusted equity ratios ranging between 0.9927 to 1.0076 for light vehicles and 0.9865 to 1.0354 for heavy vehicles. Over these biennia the gap between the heavy and light equity ratios ranged from 0.7 percent to 4.7 percent. These adjusted equity ratios indicated near-perfect equity between heavy and light vehicles.

EXHIBIT 6-2: COMPARISON OF EQUITY RATIOS FROM PREVIOUS OREGON HCASs

Declared Weight in Pounds			Study Year					
			2011	2013	2015	2017	2019	2021
1	to	10,000	0.9954	0.9927	0.9974	1.0076	0.9846	0.9539
10,001	to	26,000	1.2439	1.1189	1.0498	1.0993	1.0819	1.0945
26,001	to	78,000	0.8301	0.8885	0.9031	0.7705	0.8338	0.6878
78,001	to	80,000	1.2630	1.2014	1.3423	1.2065	1.3288	1.4342
80,001	to	104,000	0.7114	0.8084	0.6929	0.7513	0.7901	0.9176
104,001	to	105,500	0.6813	0.7444	0.7325	0.7219	0.7282	0.8910
105,501	and	up	0.4776	0.3866	0.2406	0.3133	0.1538	0.2706
		Total	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
10,001	and	up	1.0089	1.0139	1.0047	0.9865	1.0314	1.1054
26,001	to	80,000	1.1903	1.1527	1.2680	1.1310	1.2306	1.2661
80,001	to	105,500	0.6945	0.7751	0.7109	0.7348	0.7549	0.9018
26,001	to	105,500	0.9934	1.0173	1.0194	0.9847	1.0602	1.1324
26,001	and	up	0.9857	1.0023	0.9986	0.9712	1.0247	1.1068

The 2021 Study found adjusted equity ratios of 0.9539 for light vehicles and 1.1054 for heavy vehicles. The gap between the heavy and light equity ratios in 2021 is partially attributable to proposed rate and fee changes made by the legislature in HB 2017. However, most of the gap in the 2021 study is likely the residual effect of the COVID-19 pandemic and the drop in light VMT (6.5 percent) relative to the attributable increase in expenditures (9.6 percent) for that weight class.

We expect the gap will close as the economy reopens and commercial activity returns to in-person activities later into 2023 and into the following biennium. It's also important to note that the overall percent changes between revenues and expenditures is much smaller than the equity ratios imply (-0.2 percent for revenues and 2.4 percent for expenditures) between the two studies.

EXHIBIT 6-3: DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
1	0	32,048,024,635	31,315,785,783	1,464,899,817	1,431,429,531	983,820,079	967,380,551	0.9539
10,001	0	167,225,189	125,364,290	9,805,112	7,350,632	8,609,090	7,126,896	1.3685
12,001	0	75,399,842	56,292,240	5,319,209	3,971,231	4,349,791	3,609,567	1.2829
14,001	0	215,800,832	144,972,064	15,662,552	10,521,890	12,127,976	9,230,863	1.2382
16,001	0	84,164,235	72,471,260	7,354,205	6,332,482	6,519,228	5,971,464	1.3310
18,001	0	125,753,406	103,598,264	11,952,196	9,846,467	10,377,606	9,273,821	1.3293
20,001	0	24,097,203	14,732,483	2,969,708	1,815,612	1,680,197	1,281,106	0.9959
22,001	0	31,279,412	17,740,578	4,591,390	2,604,074	2,270,061	1,691,203	0.9166
24,001	0	237,632,779	171,326,547	41,585,771	29,982,170	21,978,083	17,979,480	0.8464
26,001	0	38,724,677	21,059,967	13,254,006	7,208,038	1,797,356	1,630,149	0.3192
28,001	0	16,338,033	3,146,644	5,866,598	1,129,885	646,194	279,300	0.3489
30,001	0	19,339,555	5,173,517	7,426,761	1,986,730	737,325	469,454	0.3335
32,001	0	32,549,514	23,574,370	11,816,673	8,558,365	2,371,977	2,177,885	0.3592
34,001	0	11,464,196	3,845,353	3,818,650	1,280,862	531,637	374,551	0.4127
36,001	0	4,836,271	1,826,479	1,533,552	579,165	233,183	181,368	0.4420
38,001	0	17,792,914	4,036,862	4,135,104	938,174	551,488	429,172	0.6457
40,001	0	3,485,914	2,509,401	631,560	454,640	310,555	272,669	0.8465
42,001	0	4,927,028	2,644,834	1,315,934	706,395	424,505	316,532	0.6325
44,001	0	42,440,121	33,863,840	10,454,192	8,341,613	4,764,541	4,278,410	0.7239
46,001	0	16,681,061	9,508,309	4,293,585	2,447,370	1,656,093	1,251,344	0.7217
48,001	0	27,102,199	17,551,121	6,541,182	4,236,006	2,900,277	2,349,367	0.7828
50,001	0	17,331,603	14,587,222	3,952,079	3,326,285	1,999,187	1,868,764	0.7930
52,001	0	35,749,497	29,784,854	8,129,026	6,772,734	4,295,130	4,002,027	0.8340
54,001	0	35,443,253	31,108,250	9,299,448	8,162,048	4,640,459	4,407,217	0.7621
56,001	0	14,617,444	14,183,191	4,051,659	3,931,293	2,011,414	1,992,207	0.7152
58,001	0	13,053,048	11,710,460	3,060,678	2,745,868	1,819,487	1,739,197	0.8940
60,001	0	5,086,581	4,855,699	1,163,504	1,110,692	728,206	715,970	0.9098
62,001	0	6,474,129	6,140,283	2,108,716	1,999,978	994,570	979,160	0.6910
64,001	0	14,970,944	14,472,406	3,670,157	3,547,940	2,316,237	2,300,082	0.9150
66,001	0	4,435,810	4,215,624	995,292	945,887	726,108	720,692	1.0754
68,001	0	9,784,245	9,471,549	2,991,889	2,896,271	1,723,572	1,712,720	0.8347

EXHIBIT 6-3: DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
70,001	0	3,129,181	2,980,048	811,451	772,778	572,468	568,026	1.0375
72,001	0	2,491,913	2,316,927	547,858	509,387	477,355	469,492	1.3009
74,001	0	7,770,271	7,469,495	1,836,774	1,765,675	1,579,895	1,569,218	1.2544
76,001	0	1,586,315	1,258,162	358,542	284,372	305,326	290,358	1.4411
78,001	0	1,166,473,343	1,148,852,827	267,700,527	263,656,696	268,652,946	267,909,757	1.4342
80,001	5	7,637,547	7,499,228	2,549,285	2,503,117	1,691,564	1,687,279	0.9514
80,001	6	251,557	247,167	102,814	101,020	53,127	52,955	0.7399
80,001	7	226,101	221,078	79,079	77,322	46,780	46,536	0.8495
80,001	8	746	730	12,802	12,517	148	147	0.0166
80,001	9	1,603	1,567	1,295	1,267	302	300	0.3347
82,001	5	6,078,573	5,910,005	2,238,319	2,176,247	1,458,749	1,452,204	0.9418
82,001	6	1,482,394	1,440,424	396,188	384,971	327,695	325,921	1.1949
82,001	7	74,039	71,943	36,597	35,561	15,450	15,360	0.6096
82,001	8	64,190	62,373	11,491	11,166	12,784	12,705	1.6060
82,001	9	0	0	743	0	0	0	
84,001	5	6,792,008	6,435,516	2,816,627	2,668,791	1,648,753	1,633,474	0.8639
84,001	6	4,821,549	4,572,415	1,356,600	1,286,504	1,081,899	1,069,932	1.1738
84,001	7	489,573	461,795	125,567	118,443	102,756	101,405	1.2084
84,001	8	93,484	88,180	18,488	17,439	18,691	18,430	1.4917
84,001	9	1,078	1,017	1,297	1,224	206	203	0.2338
86,001	5	2,332,701	2,281,844	919,883	899,828	522,869	522,214	0.8191
86,001	6	16,961,322	16,661,967	5,416,688	5,321,088	3,402,268	3,397,379	0.9012
86,001	7	737,202	712,077	313,716	303,024	162,320	160,939	0.7496
86,001	8	111,228	107,416	63,440	61,266	23,306	23,096	0.5321
86,001	9	1,957	1,890	6,570	6,345	390	386	0.0859
88,001	5	2,568,679	2,476,072	756,445	729,173	658,753	655,232	1.2683
88,001	6	28,958,016	28,232,115	8,669,333	8,452,016	5,913,353	5,902,633	0.9857
88,001	7	648,658	624,897	341,207	328,708	139,305	138,220	0.5935
88,001	8	75,723	72,638	65,062	62,412	15,848	15,689	0.3548
88,001	9	30,728	30,132	3,701	3,629	4,799	4,795	1.8651
90,001	5	265,218	259,830	114,277	111,956	68,378	68,222	0.8601
90,001	6	3,758,271	3,673,704	1,917,954	1,874,797	857,707	854,647	0.6434
90,001	7	470,774	458,292	352,094	342,759	103,832	103,196	0.4249
90,001	8	53,301	51,861	28,773	27,995	11,266	11,190	0.5642
90,001	9	1,492	1,452	882	859	300	298	0.4901
92,001	5	261,220	247,841	97,359	92,372	72,924	72,363	1.1057
92,001	6	1,393,096	1,323,801	431,084	409,641	331,040	328,228	1.1309
92,001	7	1,462,731	1,378,372	605,025	570,132	320,925	316,905	0.7845
92,001	8	85,478	80,549	10,080	9,499	17,901	17,663	2.6246
92,001	9	1,066	1,005	510	480	212	209	0.6147

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
94,001	5	774,480	748,022	271,310	262,042	212,917	212,437	1.1442
94,001	6	4,550,713	4,417,271	1,301,670	1,263,501	1,068,757	1,065,624	1.1904
94,001	7	17,472,928	16,731,079	6,398,955	6,127,274	3,928,802	3,896,513	0.8976
94,001	8	1,234,756	1,181,676	510,010	488,086	264,846	262,481	0.7590
94,001	9	62,648	59,955	10,928	10,458	12,759	12,638	1.7056
96,001	5	3,036,429	2,990,866	765,912	754,419	920,854	919,389	1.7201
96,001	6	5,986,180	5,931,280	1,690,760	1,675,253	1,399,064	1,398,333	1.1781
96,001	7	34,128,754	33,602,294	12,685,675	12,489,990	7,842,321	7,819,850	0.8837
96,001	8	1,918,886	1,887,778	766,744	754,315	415,203	413,883	0.7744
96,001	9	298,897	294,031	424,615	417,702	55,456	55,343	0.1870
98,001	5	0	137,536	2,249	0	6,657	0	#DIV/0!
98,001	6	875,396	857,071	241,152	236,104	227,526	226,918	1.3565
98,001	7	11,146,192	10,906,390	3,953,523	3,868,466	2,543,609	2,534,573	0.9248
98,001	8	840,770	820,612	402,522	392,872	186,319	185,403	0.6661
98,001	9	15,573	15,199	1,965	1,918	3,267	3,250	2.3920
100,001	5	0	0	738	0	0	0	
100,001	6	0	56,402	5,117	0	10,061	0	#DIV/0!
100,001	7	11,916,105	11,797,654	3,909,661	3,870,797	2,814,933	2,811,037	1.0250
100,001	8	10,623,843	10,508,401	3,854,894	3,813,005	2,411,885	2,407,507	0.8912
100,001	9	6,319	6,251	1,197	1,184	1,351	1,348	1.6069
102,001	5	0	0	982	0	0	0	
102,001	6	0	0	1,935	0	0	0	
102,001	7	3,443,261	3,416,678	1,923,293	1,908,445	822,161	821,216	0.6073
102,001	8	36,282,191	35,965,900	13,413,219	13,296,289	8,380,045	8,366,750	0.8881
102,001	9	267	265	1,219	1,209	58	58	0.0677
104,001	5	16,756	16,756	32,937	32,937	2,672	2,672	0.1145
104,001	6	274,535	274,535	57,940	57,940	57,687	57,687	1.4053
104,001	7	97,402,719	93,842,193	34,782,183	33,510,731	23,777,514	23,637,686	0.9956
104,001	8	214,469,893	206,442,576	84,566,993	81,401,766	49,597,277	49,262,461	0.8542
104,001	9	3,727,597	3,588,836	1,875,129	1,805,326	779,182	774,387	0.6054
106,001	5	0	0	181	0	3	0	
106,001	6	20,024	20,024	88,608	88,608	11,950	11,950	0.1904
106,001	7	23,143	23,143	81,554	81,554	8,258	8,258	0.1429
106,001	8	3,386	3,386	13,211	13,211	836	836	0.0893
106,001	9	1,156	1,156	3,228	3,228	239	239	0.1045
108,001	5	0	0	0	0	0	0	
108,001	6	41,553	41,553	180,047	180,047	26,461	26,461	0.2074
108,001	7	84,076	84,076	269,454	269,454	32,521	32,521	0.1703
108,001	8	7,124	7,124	26,924	26,924	1,829	1,829	0.0959
108,001	9	6,337	6,337	33,565	33,565	1,311	1,311	0.0551

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
110,001	5	0	0	0	0	0	0	
110,001	6	18,617	18,617	94,480	94,480	13,717	13,717	0.2049
110,001	7	23,516	23,516	87,469	87,469	9,566	9,566	0.1544
110,001	8	5,114	5,114	18,363	18,363	1,416	1,416	0.1088
110,001	9	3,495	3,495	10,330	10,330	793	793	0.1083
112,001	5	0	0	0	0	1	0	
112,001	6	30,160	30,160	152,623	152,623	22,523	22,523	0.2083
112,001	7	26,031	26,031	98,266	98,266	11,110	11,110	0.1596
112,001	8	2,877	2,877	11,254	11,254	825	825	0.1035
112,001	9	880	880	3,371	3,371	217	217	0.0909
114,001	5	0	0	0	0	0	0	
114,001	6	35,166	35,166	185,502	185,502	27,317	27,317	0.2078
114,001	7	98,629	98,629	325,889	325,889	43,081	43,081	0.1866
114,001	8	5,109	5,109	22,137	22,137	1,721	1,721	0.1097
114,001	9	1,899	1,899	8,526	8,526	469	469	0.0776
116,001	5	0	0	0	0	0	0	
116,001	6	15,177	15,177	88,147	88,147	12,852	12,852	0.2058
116,001	7	54,281	54,281	196,502	196,502	25,338	25,338	0.1820
116,001	8	5,137	5,137	20,418	20,418	1,833	1,833	0.1267
116,001	9	2,330	2,330	8,235	8,235	598	598	0.1025
118,001	5	0	0	1,869	0	0	0	
118,001	6	40,082	40,082	79,952	79,952	36,347	36,347	0.6416
118,001	7	123,919	123,919	450,606	450,606	64,042	64,042	0.2006
118,001	8	31,820	31,820	115,132	115,132	12,308	12,308	0.1509
118,001	9	20,123	20,123	61,189	61,189	5,570	5,570	0.1285
120,001	5	0	0	0	0	0	0	
120,001	6	34,642	34,642	55,704	55,704	33,146	33,146	0.8398
120,001	7	28,744	28,744	123,025	123,025	16,005	16,005	0.1836
120,001	8	3,046	3,046	14,534	14,534	1,239	1,239	0.1203
120,001	9	1,252	1,252	5,187	5,187	359	359	0.0977
122,001	5	0	0	0	0	0	0	
122,001	6	7,008	7,008	13,093	13,093	7,195	7,195	0.7757
122,001	7	42,980	42,980	178,619	178,619	25,221	25,221	0.1993
122,001	8	5,448	5,448	23,188	23,188	2,380	2,380	0.1449
122,001	9	506	506	3,903	3,903	171	171	0.0617
124,001	5	0	0	0	0	0	0	
124,001	6	13,951	13,951	25,490	25,490	15,720	15,720	0.8705
124,001	7	103,319	103,319	389,548	389,548	63,728	63,728	0.2309
124,001	8	10,567	10,567	46,957	46,957	4,827	4,827	0.1451
124,001	9	2,043	2,043	10,381	10,381	729	729	0.0991

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
126,001	5	0	0	0	0	0	0	
126,001	6	4,429	4,429	7,786	7,786	5,212	5,212	0.9448
126,001	7	48,356	48,356	215,121	215,121	31,277	31,277	0.2052
126,001	8	9,725	9,725	44,569	44,569	4,539	4,539	0.1438
126,001	9	1,789	1,789	8,162	8,162	674	674	0.1166
128,001	5	0	0	0	0	0	0	
128,001	6	1,611	1,611	3,336	3,336	2,073	2,073	0.8772
128,001	7	126,665	126,665	553,736	553,736	90,794	90,794	0.2314
128,001	8	20,654	20,654	93,469	93,469	10,674	10,674	0.1612
128,001	9	3,343	3,343	16,273	16,273	1,293	1,293	0.1122
130,001	5	0	0	0	0	0	0	
130,001	6	0	0	360	0	0	0	
130,001	7	60,228	60,228	283,186	283,186	46,183	46,183	0.2302
130,001	8	13,170	13,170	63,373	63,373	7,333	7,333	0.1633
130,001	9	2,326	2,326	9,723	9,723	946	946	0.1374
132,001	5	0	0	0	0	0	0	
132,001	6	386	386	693	693	574	574	1.1694
132,001	7	60,839	60,839	317,026	317,026	49,694	49,694	0.2212
132,001	8	14,007	14,007	68,531	68,531	7,939	7,939	0.1635
132,001	9	839	839	5,013	5,013	341	341	0.0961
134,001	5	0	0	0	0	0	0	
134,001	6	131	131	1,201	1,201	206	206	0.2421
134,001	7	121,582	121,582	594,031	594,031	102,956	102,956	0.2446
134,001	8	25,683	25,683	124,042	124,042	15,328	15,328	0.1744
134,001	9	6,981	6,981	29,886	29,886	3,049	3,049	0.1440
136,001	5	0	0	0	0	0	0	
136,001	6	0	0	1	0	0	0	
136,001	7	32,359	32,359	193,402	193,402	29,991	29,991	0.2189
136,001	8	17,466	17,466	32,237	32,237	11,122	11,122	0.4870
136,001	9	3,999	3,999	16,292	16,292	1,827	1,827	0.1582
138,001	5	0	0	0	0	0	0	
138,001	6	0	0	51	0	0	0	
138,001	7	86,835	86,835	499,278	499,278	84,820	84,820	0.2398
138,001	8	39,917	39,917	201,999	201,999	26,617	26,617	0.1860
138,001	9	6,106	6,106	28,743	28,743	2,850	2,850	0.1400
140,001	5	0	0	0	0	0	0	
140,001	6	0	0	0	0	0	0	
140,001	7	25,532	25,532	166,212	166,212	26,727	26,727	0.2270
140,001	8	24,561	24,561	133,889	133,889	18,097	18,097	0.1908
140,001	9	2,016	2,016	10,229	10,229	981	981	0.1354

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
142,001	5	0	0	0	0	0	0	
142,001	6	0	0	0	0	0	0	
142,001	7	13,982	13,982	138,860	138,860	15,754	15,754	0.1601
142,001	8	24,370	24,370	142,163	142,163	18,931	18,931	0.1880
142,001	9	2,893	2,893	12,927	12,927	1,553	1,553	0.1696
144,001	5	0	0	0	0	0	0	
144,001	6	0	0	0	0	0	0	
144,001	7	52,063	52,063	358,375	358,375	61,268	61,268	0.2413
144,001	8	50,063	50,063	272,104	272,104	40,892	40,892	0.2121
144,001	9	6,973	6,973	34,721	34,721	3,883	3,883	0.1578
146,001	5	0	0	0	0	0	0	
146,001	6	0	0	0	0	0	0	
146,001	7	75,121	75,121	195,507	195,507	95,164	95,164	0.6870
146,001	8	34,687	34,687	210,629	210,629	28,680	28,680	0.1922
146,001	9	3,613	3,613	19,027	19,027	2,048	2,048	0.1519
148,001	5	0	0	0	0	0	0	
148,001	6	0	0	0	0	0	0	
148,001	7	17,003	17,003	30,811	30,811	22,730	22,730	1.0412
148,001	8	52,075	52,075	322,345	322,345	47,221	47,221	0.2068
148,001	9	13,150	13,150	63,837	63,837	7,716	7,716	0.1706
150,001	5	0	0	0	0	0	0	
150,001	6	0	0	0	0	0	0	
150,001	7	9,695	9,695	14,768	14,768	13,542	13,542	1.2943
150,001	8	16,992	16,992	113,364	113,364	16,088	16,088	0.2003
150,001	9	8,827	8,827	40,655	40,655	5,445	5,445	0.1890
152,001	5	0	0	0	0	0	0	
152,001	6	0	0	0	0	0	0	
152,001	7	65	65	136	136	97	97	1.0100
152,001	8	38,289	38,289	263,615	263,615	38,167	38,167	0.2043
152,001	9	5,678	5,678	27,432	27,432	3,616	3,616	0.1860
154,001	5	0	0	0	0	0	0	
154,001	6	0	0	0	0	0	0	
154,001	7	293	293	673	673	453	453	0.9509
154,001	8	33,241	33,241	225,737	225,737	34,132	34,132	0.2134
154,001	9	11,462	11,462	68,665	68,665	7,643	7,643	0.1571
156,001	5	0	0	0	0	0	0	

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
156,001	5	0	0	0	0	0	0	
156,001	6	0	0	0	0	0	0	
156,001	7	0	0	85	0	0	0	
156,001	8	35,013	35,013	253,470	253,470	38,752	38,752	0.2158
156,001	9	7,713	7,713	39,569	39,569	5,760	5,760	0.2055
158,001	5	0	0	0	0	0	0	
158,001	6	0	0	0	0	0	0	
158,001	7	0	0	65	0	0	0	
158,001	8	58,131	58,131	101,066	101,066	66,083	66,083	0.9229
158,001	9	30,342	30,342	162,130	162,130	23,570	23,570	0.2052
160,001	5	0	0	0	0	0	0	
160,001	6	0	0	0	0	0	0	
160,001	7	0	0	12	0	0	0	
160,001	8	12,129	12,129	26,443	26,443	14,395	14,395	0.7683
160,001	9	6,057	6,057	34,009	34,009	4,948	4,948	0.2053
162,001	5	0	0	0	0	0	0	
162,001	6	0	0	0	0	0	0	
162,001	7	0	0	0	0	0	0	
162,001	8	5,894	5,894	15,830	15,830	7,585	7,585	0.6762
162,001	9	12,420	12,420	66,262	66,262	10,518	10,518	0.2240
164,001	5	0	0	0	0	0	0	
164,001	6	0	0	0	0	0	0	
164,001	7	0	0	194	0	0	0	
164,001	8	10,503	10,503	20,898	20,898	14,040	14,040	0.9482
164,001	9	31,780	31,780	178,729	178,729	28,818	28,818	0.2276
166,001	5	0	0	0	0	0	0	
166,001	6	0	0	0	0	0	0	
166,001	7	0	0	0	0	0	0	
166,001	8	11,256	11,256	18,474	18,474	15,610	15,610	1.1926
166,001	9	13,592	13,592	77,314	77,314	13,005	13,005	0.2374
168,001	5	0	0	0	0	0	0	
168,001	6	0	0	0	0	0	0	
168,001	7	306	306	452	452	655	655	2.0443
168,001	8	12,229	12,229	131,706	131,706	17,938	17,938	0.1922
168,001	9	41,310	41,310	239,139	239,139	41,591	41,591	0.2455
170,001	5	0	0	0	0	0	0	
170,001	6	0	0	0	0	0	0	
170,001	7	0	0	0	0	0	0	

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
170,001	8	2,484	2,484	4,051	4,051	3,768	3,768	1.3131
170,001	9	13,823	13,823	82,731	82,731	14,470	14,470	0.2469
172,001	5	0	0	0	0	0	0	
172,001	6	0	0	0	0	0	0	
172,001	7	0	0	0	0	0	0	
172,001	8	1	1	145	145	2	2	0.0147
172,001	9	23,335	23,335	142,795	142,795	26,294	26,294	0.2599
174,001	5	0	0	0	0	0	0	
174,001	6	0	0	0	0	0	0	
174,001	7	0	0	0	0	0	0	
174,001	8	0	0	33	0	0	0	
174,001	9	43,108	43,108	271,016	271,016	49,868	49,868	0.2597
176,001	5	0	0	0	0	0	0	
176,001	6	0	0	0	0	0	0	
176,001	7	0	0	1	0	0	0	
176,001	8	0	0	11	0	0	0	
176,001	9	13,861	13,861	89,761	89,761	16,728	16,728	0.2630
178,001	5	0	0	0	0	0	0	
178,001	6	0	0	0	0	0	0	
178,001	7	0	0	0	0	0	0	
178,001	8	0	0	1	0	1	0	
178,001	9	58,393	58,393	381,292	381,292	75,140	75,140	0.2781
180,001	5	0	0	0	0	0	0	
180,001	6	0	0	0	0	0	0	
180,001	7	0	0	0	0	0	0	
180,001	8	0	0	0	0	0	0	
180,001	9	18,208	18,208	114,667	114,667	24,340	24,340	0.2996
182,001	5	0	0	0	0	0	0	
182,001	6	0	0	0	0	0	0	
182,001	7	0	0	0	0	0	0	
182,001	8	0	0	0	0	0	0	
182,001	9	35,354	35,354	232,666	232,666	49,029	49,029	0.2974
184,001	5	0	0	0	0	0	0	
184,001	6	0	0	0	0	0	0	
184,001	7	0	0	0	0	0	0	
184,001	8	297	297	462	462	620	620	1.8929
184,001	9	54,455	54,455	385,639	385,639	79,875	79,875	0.2923
186,001	5	0	0	0	0	0	0	
186,001	6	0	0	0	0	0	0	

EXHIBIT 6-3 (CONTINUED): DETAILED COMPARISON OF AVERAGE ANNUAL COST RESPONSIBILITY AND USER FEES PAID BY FULL-FEE-PAYING VEHICLES BY DECLARED WEIGHT CLASS

Weight Class	Axles	Annual VMT		Annual Cost Responsibility		Annual User Fees		Full-Fee Scaled Equity Ratio
		All	Full-Fee	All	Full-Fee	All	Full-Fee	
186,001	7	0	0	0	0	0	0	
186,001	8	0	0	0	0	0	0	
186,001	9	15,034	15,034	110,650	110,650	22,502	22,502	0.2870
188,001	5	0	0	0	0	0	0	
188,001	6	0	0	0	0	0	0	
188,001	7	0	0	0	0	0	0	
188,001	8	0	0	1	0	0	0	
188,001	9	55,620	55,620	407,690	407,690	87,145	87,145	0.3017
190,001	5	0	0	0	0	0	0	
190,001	6	0	0	0	0	0	0	
190,001	7	0	0	0	0	0	0	
190,001	8	0	0	0	0	0	0	
190,001	9	24,830	24,830	183,450	183,450	40,890	40,890	0.3146
192,001	5	0	0	0	0	0	0	
192,001	6	0	0	0	0	0	0	
192,001	7	0	0	0	0	0	0	
192,001	8	0	0	0	0	0	0	
192,001	9	14,652	14,652	119,740	119,740	25,008	25,008	0.2948
194,001	5	0	0	0	0	0	0	
194,001	6	0	0	0	0	0	0	
194,001	7	0	0	0	0	0	0	
194,001	8	0	0	6	0	0	0	
194,001	9	48,912	48,912	372,744	372,744	85,928	85,928	0.3254
196,001	5	0	0	0	0	0	0	
196,001	6	0	0	0	0	0	0	
196,001	7	0	0	0	0	0	0	
196,001	8	0	0	0	0	0	0	
196,001	9	27,881	27,881	218,926	218,926	51,213	51,213	0.3302
198,001	5	0	0	0	0	0	0	
198,001	6	0	0	0	0	0	0	
198,001	7	0	0	0	0	0	0	
198,001	8	0	0	0	0	0	0	
198,001	9	89,798	89,798	182,867	182,867	169,430	169,430	1.3077
200,001	5	0	0	0	0	0	0	
200,001	6	0	0	0	0	0	0	
200,001	7	0	0	0	0	0	0	
200,001	8	0	0	0	0	0	0	
200,001	9	218,174	218,174	1,848,490	1,848,490	426,924	426,924	0.3260

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CHAPTER 7: RECOMMENDATIONS FOR CHANGES IN TAX RATES

This section calculates the "as-if" rate changes to return the light and heavy vehicle classes to equity under an alternative scenario. However, due to the recent economic shock, this report does not recommend any change that would affect the distribution of revenue burdens between light and heavy vehicles for the 2021-23 biennium. If rates are adjusted for other reasons, which reside outside the scope of this study, those adjustment should strive to maintain the proportional burden on light and heavy vehicles by adjusting either rates, or the overall distribution of spending.

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 61.7 percent of vehicle miles by full-fee-paying vehicles over 26,000 pounds) 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 under the projected spending during the biennium. 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.[10]

FIGURE 7-1: WEIGHT-MILE TAX TABLE A

Declared Weight	Current WMT Rate	Alternative Rate	Difference	Percent Difference
26001 to 28000	0.0654	0.0600	-0.0054	-8.26%
28001 to 30000	0.0693	0.0620	-0.0073	-10.53%
30001 to 32000	0.0724	0.0641	-0.0083	-11.46%
32001 to 34000	0.0757	0.0662	-0.0095	-12.55%
34001 to 36000	0.0786	0.0684	-0.0102	-12.98%
36001 to 38000	0.0827	0.0707	-0.0120	-14.51%
38001 to 40000	0.0858	0.0730	-0.0128	-14.92%
40001 to 42000	0.0889	0.0754	-0.0135	-15.19%
42001 to 44000	0.0922	0.0779	-0.0143	-15.51%
44001 to 46000	0.0953	0.0805	-0.0148	-15.53%
46001 to 48000	0.0984	0.0832	-0.0152	-15.45%
48001 to 50000	0.1016	0.0860	-0.0156	-15.35%
50001 to 52000	0.1054	0.0888	-0.0166	-15.75%
52001 to 54000	0.1093	0.0917	-0.0176	-16.10%
54001 to 56000	0.1134	0.0947	-0.0187	-16.49%
56001 to 58000	0.1181	0.0978	-0.0203	-17.19%
58001 to 60000	0.1235	0.1010	-0.0225	-18.22%
60001 to 62000	0.1299	0.1043	-0.0256	-19.71%
62001 to 64000	0.1371	0.1078	-0.0293	-21.37%
64001 to 66000	0.1449	0.1114	-0.0335	-23.12%
66001 to 68000	0.1552	0.1151	-0.0401	-25.84%
68001 to 70000	0.1662	0.1189	-0.0473	-28.46%
70001 to 72000	0.1771	0.1228	-0.0543	-30.66%
72001 to 74000	0.1873	0.1269	-0.0604	-32.25%
74001 to 76000	0.1969	0.1311	-0.0658	-33.42%
76001 to 78000	0.2064	0.1354	-0.0710	-34.40%
78001 to 80000	0.2150	0.1400	-0.0750	-34.88%

[10] 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.

Table A rates are specified for each 2,000-pound declared gross weight increment. The rates for 2021 range from 6.54 cents per mile for vehicles declared at 26,001-28,000 pounds to 21.50 cents per 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 6.00 cents per mile to 14.00 cents per mile, as shown in Exhibit 7-1. These modified rates are lower than the existing rates across all weight classes and would result in a 25.5 percent reduction in revenue collected from vehicles paying Table A rates. If Table A rates are to be adjusted as recommended here, Table B rates must also be adjusted as described below to maintain revenue neutrality.

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 96,000 pounds, for example, the per-mile rate for a five-axle vehicle is 30.25 cents and the rate for a six-axle vehicle is 24.97 cents. Thus, by adding an axle, a carrier can reduce his or her tax liability by more than five cents per mile. Current Table B rates range from 17.01 cents per mile for a nine-axle vehicle declared at 82,000 pounds to 30.25 cents per

FIGURE 7-2: WEIGHT-MILE TAX TABLE B

Declared Weight	Axles	WMT Rate	Alternative Rate	Difference	Percent Difference
80,001 to 82,000	5	0.2221	0.2105	-0.01	-5.21%
80,001 to 82,001	6	0.2031	0.1848	-0.02	-8.99%
80,001 to 82,002	7	0.1899	0.1949	0.00	2.62%
80,001 to 82,003	8	0.1804	0.1700	-0.01	-5.76%
80,001 to 82,004	9	0.1701	0.1600	-0.01	-5.94%
82,001 to 84,000	5	0.2293	0.2163	-0.01	-5.67%
82,001 to 84,000	6	0.2064	0.1889	-0.02	-8.48%
82,001 to 84,000	7	0.1930	0.1985	0.01	2.85%
82,001 to 84,000	8	0.1827	0.1731	-0.01	-5.25%
82,001 to 84,000	9	0.1724	0.1627	-0.01	-5.63%
84,001 to 86,000	5	0.2361	0.2222	-0.01	-5.89%
84,001 to 86,000	6	0.2111	0.1931	-0.02	-8.53%
84,001 to 86,000	7	0.1961	0.2022	0.01	3.11%
84,001 to 86,000	8	0.1850	0.1763	-0.01	-4.70%
84,001 to 86,000	9	0.1748	0.1655	-0.01	-5.32%
86,001 to 88,000	5	0.2441	0.2283	-0.02	-6.47%
86,001 to 88,000	6	0.2157	0.1974	-0.02	-8.48%

FIGURE 7-2 (CONTINUED): WEIGHT-MILE TAX TABLE B

Declared Weight	Axles	WMT Rate	Alternative Rate	Difference	Percent Difference
86,001 to 88,000	7	0.1992	0.2059	0.01	3.36%
86,001 to 88,000	8	0.1882	0.1796	-0.01	-4.57%
86,001 to 88,000	9	0.1771	0.1683	-0.01	-4.97%
88,001 to 90,000	5	0.2536	0.2345	-0.02	-7.53%
88,001 to 90,000	6	0.2213	0.2018	-0.02	-8.81%
88,001 to 90,000	7	0.2025	0.2097	0.01	3.56%
88,001 to 90,000	8	0.1913	0.1829	-0.01	-4.39%
88,001 to 90,000	9	0.1804	0.1712	-0.01	-5.10%
90,001 to 92,000	5	0.2646	0.2409	-0.02	-8.96%
90,001 to 92,000	6	0.2276	0.2063	-0.02	-9.36%
90,001 to 92,000	7	0.2054	0.2136	0.01	3.99%
90,001 to 92,000	8	0.1945	0.1863	-0.01	-4.22%
90,001 to 92,000	9	0.1835	0.1741	-0.01	-5.12%
92,001 to 94,000	5	0.2765	0.2475	-0.03	-10.49%
92,001 to 94,000	6	0.2338	0.2109	-0.02	-9.79%
92,001 to 94,000	7	0.2087	0.2175	0.01	4.22%
92,001 to 94,000	8	0.1976	0.1897	-0.01	-4.00%
92,001 to 94,000	9	0.1860	0.1771	-0.01	-4.78%
94,001 to 96,000	5	0.2891	0.2543	-0.03	-12.04%
94,001 to 96,000	6	0.2410	0.2156	-0.03	-10.54%
94,001 to 96,000	7	0.2126	0.2215	0.01	4.19%
94,001 to 96,000	8	0.2008	0.1932	-0.01	-3.78%
94,001 to 96,000	9	0.1889	0.1801	-0.01	-4.66%
96,001 to 98,000	5	0.3025	0.2909	-0.01	-3.82%
96,001 to 98,000	6	0.2497	0.2204	-0.03	-11.73%
96,001 to 98,000	7	0.2173	0.2256	0.01	3.82%
96,001 to 98,000	8	0.2041	0.1968	-0.01	-3.58%
96,001 to 98,000	9	0.1922	0.1832	-0.01	-4.68%
98,001 to 100,000	6	0.2590	0.2407	-0.02	-7.05%
98,001 to 100,000	7	0.2221	0.2298	0.01	3.47%
98,001 to 100,000	8	0.2079	0.2004	-0.01	-3.61%
98,001 to 100,000	9	0.1953	0.1863	-0.01	-4.61%
100,001 to 102,000	7	0.2268	0.2340	0.01	3.17%
100,001 to 102,000	8	0.2126	0.2041	-0.01	-4.00%
100,001 to 102,000	9	0.1985	0.1895	-0.01	-4.53%
102,001 to 104,000	7	0.2315	0.2383	0.01	2.94%
102,001 to 104,000	8	0.2173	0.2079	-0.01	-4.33%
102,001 to 104,000	9	0.2025	0.1928	-0.01	-4.79%
104,001 to 106,000	7	0.2378	0.2428	0.00	2.09%
104,001 to 106,000	8	0.2221	0.2117	-0.01	-4.68%
104,001 to 106,000	9	0.2064	0.1963	-0.01	-4.89%

mile for a five-axle vehicle declared at 96,000 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. Before the 2015 study, flat fee vehicles were classified as alternative fee vehicles.

When paying the weight-mile tax, log haulers can use a lower declared weight when their trailer is empty and stowed above the tractor unit. It was assumed that 55 percent of log-truck miles are with an empty, decked trailer. Weight-mile taxes apply only to miles on public roads in Oregon, but log trucks may incur some of their miles on private logging roads.

The existing statutory flat fee rate for carriers transporting logs is $9.10 per 100 pounds of declared combined weight. These that are typically paid in monthly installments. The monthly flat fee applicable to a log truck declared at 80,000 pounds, for example, is $606.67 ($9.10 x 800 = $7,280/12 months = $606.80). 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 August 2020 and entitled “Testing for Revenue Neutrality of Flat Fee Firms in Oregon (2019).”

That study compared flat fee revenues in 2019 to what those vehicles would have paid in weight-mile tax in 2019. The 2019 flat fee study found that sand and gravel haulers underpaid by 40.03 percent relative to what they otherwise would have paid on a per-mileage basis, while log haulers overpaid by 5.89 percent. There were not flat fee records recorded for wood chip haulers for the 2019 study.

In 2017, the legislature passed HB2017, which increases flat fees by 53.4 percent between 2018 and 2024. A large share of the rate increases (around 32 percent) are front-loaded between 2018 and 2020. Based on the proposed rate changes from the legislature, the report recommends waiting until the impact of those new rates can be assessed across commodities before recommending further adjustment.

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.[11]

The fees carriers 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.

For the 2021 HCAS, the equity ratios presented in Chapter 6 suggest that vehicles in weight classes above 105,500 significantly underpay relative to their cost responsibility. With the rate changes from HB 2017 and dramatic impact on economic activity associated with the COVID-19 pandemic, this report does not recommend further changes to the flat fee rates for the current biennium.

[11] See Appendix A for a detailed explanation of declared and operating weight.