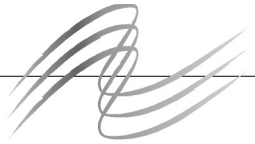
1999
OREGON
HIGHWAY
PLAN



System Element

System Element

State Highway Needs Analysis

Oregon's ability to implement highway programs in the future is grounded in the current condition of state highways, projected future use of the system and projected transportation revenues. The "Description of the Highway System" section beginning on page 33 discusses future trends. This section summarizes current conditions, the highway needs analysis, and user costs.

Current Infrastructure Condition

ODOT evaluates the condition of the state highway system's pavements on an annual basis using a visual assessment scale ranging from "very poor" to "very good." According to ODOT's 1997 Pavement Condition Report, 77 percent of state highway mileage is in "fair or better condition" (Figure 12), down 1 percent from 1996 (Figure 13).

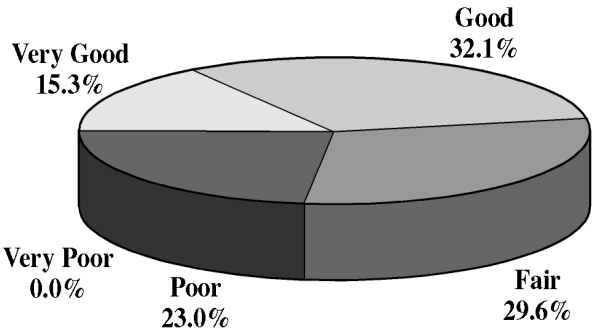


Figure 12: Overall state highway pavement condition, 1997

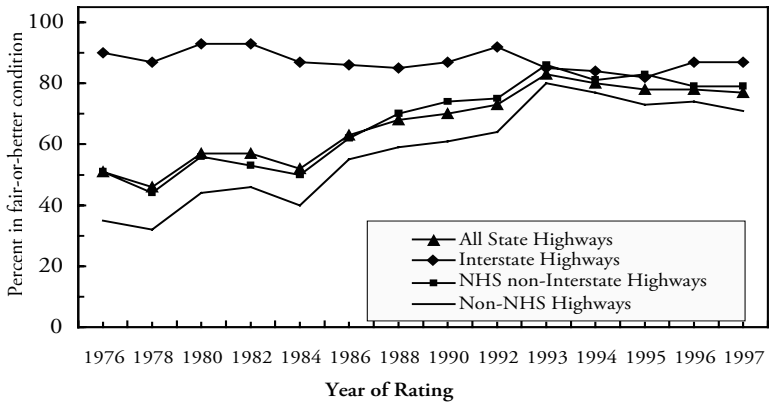


Figure 13: History of state highway pavement conditions

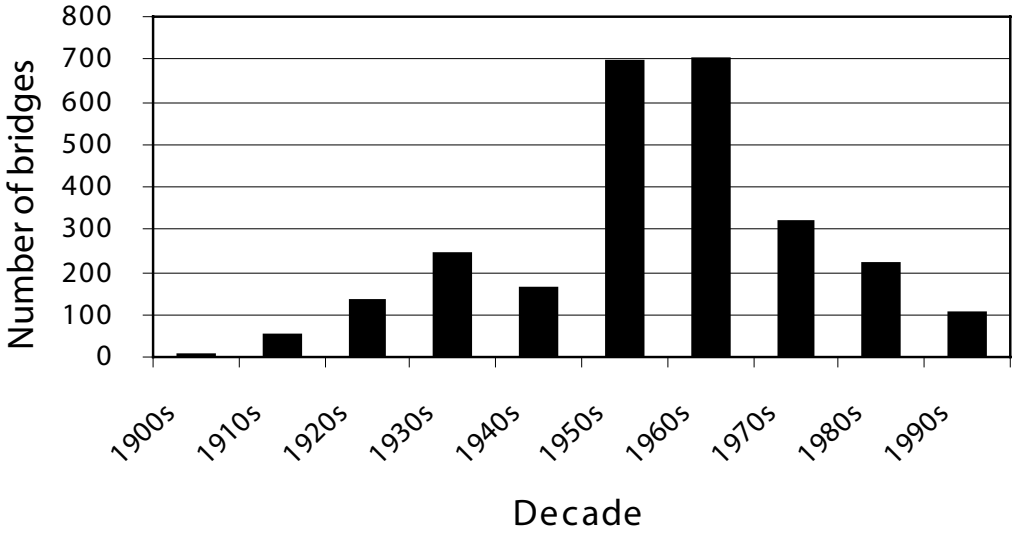


Figure 14: Original construction year of ODOT bridges

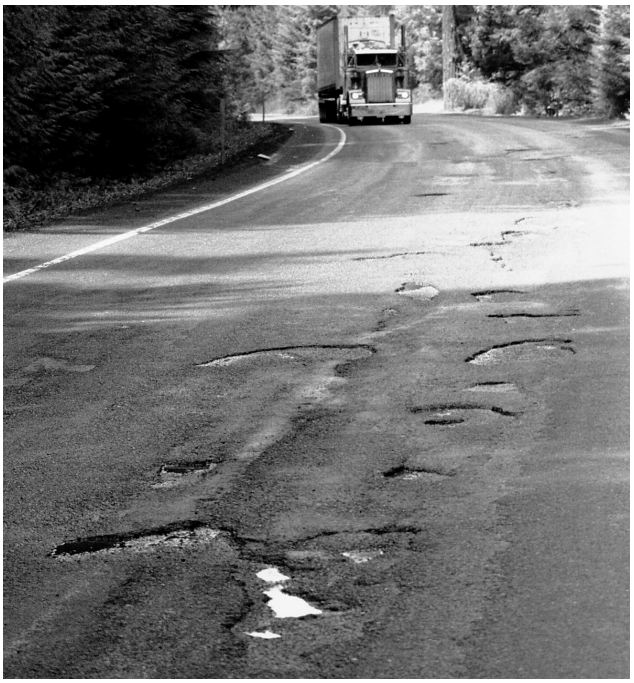
There are 2,551 bridges on the state highway system, about 38 percent of the bridges in the state. About 95 percent of ODOT bridges are either steel or concrete, and 5 percent are timber. By the year 2000, 76 percent of Oregon's state-owned bridges will be more than 30 years old, and 23 percent will be more than 50 years old (Figure 14).

ODOT's goal is to maintain highway infrastructure in good condition. Not only does this provide the safest, smoothest ride for the public, but it is also the most cost-effective way to do business in the long run. This is because deterioration and repair costs accelerate rapidly over time (Figure 15, page 143). On average, for every dollar spent treating pavement in "fair or better" condition, four dollars are required to repair that same pavement once it has reached "poor" condition.

For this reason, ODOT has established a goal of having 90 percent of state highway pavements in "fair or better" condition. If this goal is to be reached by the year 2010, the average amount of paving completed each year will need to be increased from 550 miles (880 kilometers) to approximately 630 miles (1,010 kilometers). However, recent budgets have not even allowed ODOT to maintain pavement conditions.

Over the 20-year planning period of the Highway Plan, the state would need to perform 1,553 major bridge replacement and rehabilitation projects to keep state-owned bridges at current conditions. This includes work to repair seismic and load deficiencies; strengthen bridge footings; repair decks, railings, mechanical and electrical systems; and perform corrosion and painting projects.

As traffic volumes increase because of population increases, state highways reach capacity during all or part of the day, affecting safety, livability and economic activity. Based on projected traffic volumes, ODOT has identified highway segments that need added lanes, new alignments, bypasses and other major improvements. Some of these are needs and projects identified through corridor plans and/or regional and local transportation system plans. Without these projects, traffic speeds and movements, especially in metropolitan areas, will dramatically decrease over the next 20 years.



Oregon 58, a major freight route, east of Oakridge shows the signs of surface damage caused by harsh winter weather.

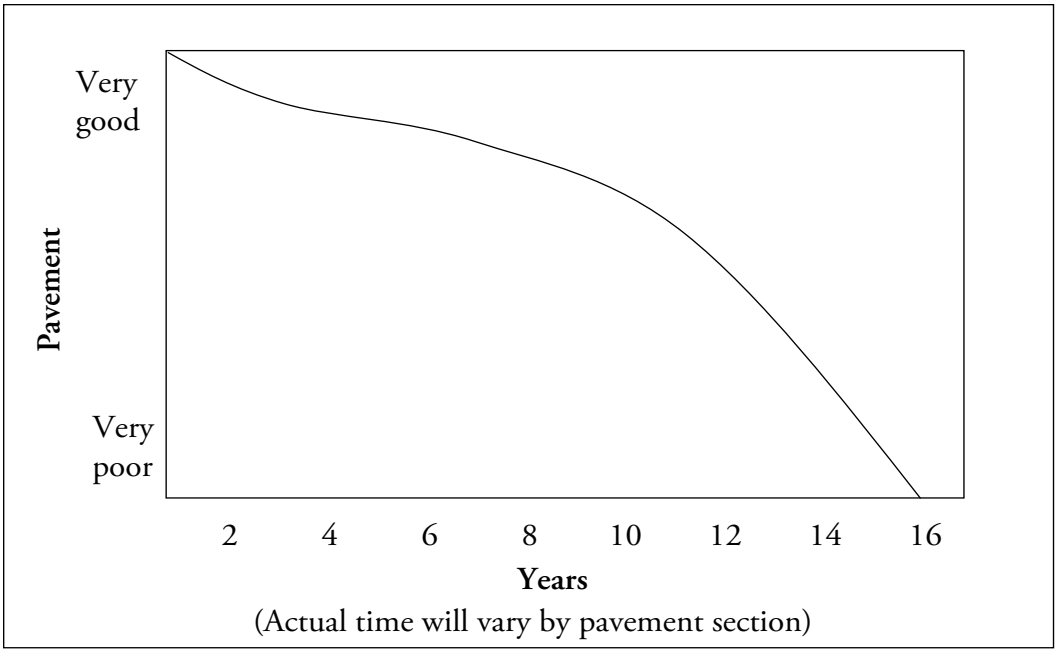


Figure 15: Typical pavement deterioration pattern

ODOT's goal is also to make the system efficient and safe. Replacing traffic signs and guardrails, interconnecting traffic signals and using intelligent transportation systems are means for achieving this goal. The needs analysis presents more details on these projects and associated costs.

20-Year Needs Summary

Funding needs for the state highway system reflect infrastructure condition and deterioration, traffic volumes and congestion, safety programs, management, operation and maintenance of the system, and related planning, administrative and support services as well as the policies in this plan.

Since the Highway Plan only addresses ODOT's highway programs, many important ODOT departments and programs are not covered by this needs analysis and revenue projection, including Driver and Motor Vehicle Services, Motor Carrier Transportation, Public Transit, Rail and Aeronautics.

The Highway Plan breaks ODOT's highway responsibility into eleven major programs and categories: modernization, preservation, bridge, maintenance, operations, safety, special programs, construction support, planning, administration and central services.

Policies in this Plan may affect the funding needs of these programs. The Land Use/ Transportation Policy and Off-System Improvements Policy suggest that funds are needed to assist local governments in making improvements in Special Transportation Areas and on off-system arterials and collectors that benefit movement on the state highway system. Funding for improvements in Special Transportation Areas needs to be identified. The costs of off-system improvements should be offset by reductions in the modernization needs. The freight-related policies call for thicker pavements on designated freight routes and improvements to obstacles to freight movements. The needs analysis for preservation includes funding for thicker pavements. The modernization needs analysis includes geometric improvements to rights-of-way that impede truck movements. The Scenic Byways Policy calls for enhancing designated Scenic Byways. The needs analysis includes some funding for improvements, but relies on federal grants for the majority of the funding. No specific funding for Scenic Byways is included in the maintenance program needs. The Major Improvements Policy should reduce modernization needs since the policy requires examination and implementation of less costly alternatives before a major improvement is constructed.

Funding for the Intelligent Transportation System, Traffic Safety, and Rail and Highway Compatibility Policies are included in the needs analysis. Some funding to buy access is included under the safety program, but more is needed to fully implement the access management program. Most of the funding for the Travel Alternatives and Environmental Policies are also included in the analysis although

additional funding, largely for maintenance, may be needed to carry out the Scenic Resources Policy. Funding for HOV lanes should come from the modernization and/or operations programs, but needs for HOV lanes have not been identified. The needs created by these policies mean that the needs analysis underestimates the total highway needs.

The following list contains a general description of each program or category, some examples of typical projects and costs in that category and a summary of 20-year program needs. More detailed program definitions are presented in Appendix B.

For each highway program, needs estimates are presented for both average yearly and total 20-year investment. The costs were calculated in 1997 dollars. However, the effects of inflation must be considered in order to present a true picture of future buying power. Although inflation is currently quite low – 2.3 percent in 1997 – the State projects that it will increase gradually over the 20-year period, reaching 3.9 percent by 2017. The Highway Plan uses the State of Oregon forecast which projects an average annual inflation rate of 3.3 percent for the 20-year period from 1998 to 2017.

Inflation means that buying power decreases over time unless more dollars are spent. For example, an annual inflation of 3.3 percent means that a program that spent $100,000 in 1997 would have to spend $103,300 in 1998 to achieve the same results. Inflation takes on particular importance over the 20-year Highway Plan period: a program that required $100,000 in 1997 would require $190,635 in 2017 with the average 3.3 percent inflation rate used in this plan. That is, if expenditures were not adjusted for inflation, a program would only have 52 percent of its original buying power after 20 years of 3.3 percent inflation.

The annual needs presented are averages. In some cases, programs require higher investments now and lower investments in the future. As discussed above, this is often the most cost-effective way to maintain highway infrastructure: Higher investments in the short term result in savings over the long term.

1. **Modernization.** The primary goal of modernization projects is to add capacity to the highway system in order to facilitate existing traffic and/or accommodate projected traffic growth. Modernization means capacity-adding projects including HOV lanes and off-system improvements. Projects in this category include major widening of lanes or bridges, and the addition of lanes, rest areas or entire facilities.

   The cost of modernization projects can vary greatly because there are several different types of projects in this category. However, recent modernization projects and their costs in 1997 dollars provide some examples:

   - Widening and reconstruction of 3 miles of Highway 62 north of Medford: $8 million.

- Construction of 4.2 miles of new highway on Route 20 west of Corvallis: $20 million.

- Construction of the Chenoweth interchange on Interstate 84 at The Dalles: $10 million.

- Typical left turn lane: $150,000.

- Typical passing lane (one direction): $650,000.

Modernization needs were calculated by combining current traffic conditions with projections of future highway demand in a computer model. ODOT staff checked the results of the modeling for feasibility and added projects that had been identified in corridor plans and local transportation system plans. The result is an estimate of feasible needs on the state highway system that would allow the state to meet current design standards and minimum tolerable conditions.

Crews are adding a lane to a segment of Interstate 84 on Emigrant Hill near

2. **Preservation.** The preservation program includes rehabilitative work on roadways and improvements to rebuild or extend the service life of existing facilities. Preservation projects, such as paving, striping and reconstruction, add useful life to a road without increasing its capacity.

Paving costs alone for a two-lane roadway are typically from $100,000 to $200,000 per mile. However, preservation costs can vary greatly depending on the type of treatment required, existing traffic flow and patterns, and the cost of other features (such as safety guardrails) that are included in the total project. The average cost of preservation projects in the 1998-2001 Statewide Transportation Improvement Program was $220,000 per mile. Recent preservation projects provide examples of this variation:

- Five miles on the northbound lanes of Interstate 5 near Albany: $388,000 per mile.
- 21 miles on the Ukiah-Hilgard Highway near the Union County line: $55,000 per mile.
- Three miles on the Oregon Coast Highway in Newport: $900,000 per mile.
- 11 miles on Highway 97 beginning at the California border: $159,000 per mile.

Preservation needs were estimated by determining the cost of getting 90 percent of state highway pavement to be in "fair or better" condition by the year 2010 and keeping it at this level until 2017. In 1997, statewide pavement condition was 77 percent fair or better. The Pavement Management System was used to determine the required investment. Current funding levels will lead to a decline in pavement conditions.

3. **Bridge.** Bridge projects include improvements or work needed to rebuild or extend the service life of existing bridge structures. These projects include bridge reconstruction or replacement, painting, seismic retrofitting to mitigate the effects of earthquakes, and overpass screening as well as major work on tunnels and large culverts.

   Bridge projects vary greatly in expense according to the type of work required, the location, and the type of bridge being considered. Projects identified in the bridge needs analysis provide examples of costs:

   - Rehabilitation of the Willamette River Bridge on Interstate 205 in West Linn to allow it to perform vital functions after a moderate earthquake: $8 million.
   - Cleaning and repainting of the 3,500-foot long northbound Interstate Bridge over the Columbia River in Portland: $23 million. Costs are high due to the bridge's size and the environmental and lead-abatement requirements of the project.
   - Replacement of the Kahler Creek Bridge on the John Day Highway in Wheeler County: $400,000.

- Replacement of rails on the Gales Creek Bridge in rural Washington County: $73,000.

Bridge needs were calculated from existing inventories and inspection databases. Only the most critical third of the identified seismic retrofit needs were included in the needs analysis. At the current level of funding, bridges are declining in condition and value.

4. **Maintenance.** Maintenance covers many areas relating to the appearance and functionality of the highway system, including surface repairs, drainage work, minor structural work, maintenance of signs, signals, lighting, rest areas, and snow and ice removal.

   Maintenance needs were estimated on the basis of current expenditures by assuming that maintenance practices will continue as they are today. Facility conditions under current funding levels are declining. Any additional facilities or infrastructure will require additional funding.

5. **Operations.** Operations investments increase the efficiency of the highway system, leading to safer traffic operations and greater system reliability. Operations programs include interconnected traffic signal systems, new traffic signals, ramp meters, signs, other control devices, Intelligent Transportation System features, transportation demand management, and rock fall and slide repairs.

   Typical costs for the operations program include the following:

   - Replacement of a typical traffic signal: $150,000.
   - Replacement of an electronic variable message sign: $200,000.
   - Replacement or rehabilitation of a typical sign on an Interstate Highway: $5,000.
   - Placement of ramp meters: $100,000.

   Operations needs were based on staff estimates of individual program costs.

6. **Safety.** The safety program focuses on investments which address priority hazardous highway locations and corridors in order to reduce the number of fatal and serious injury crashes. Projects funded through this program meet strict benefit/cost criteria. Safety projects may include access management features, guardrails, illumination, signing, rumble strips and railroad crossing improvements.

   Safety needs were based on current and projected costs for each activity.

SUMMARY OF FEASIBLE NEEDS				
PROGRAM	Average annual investment assuming no inflation (millions)	20-year total investment assuming no inflation (millions)	Average annual investment assuming 3.3% inflation (millions)	20-year total investment assuming 3.3% inflation (millions)
Modernization	$339	$6,785	$471	$9,428
Preservation	$172	$3,436	$239	$4,774
Maintenance	$159	$3,180	$221	$4,419
Bridge	$133	$2,664	$185	$3,702
Safety	$35	$694	$48	$964
Operations	$29	$576	$40	$801
Special Programs	$29	$581	$40	$807
Construction Support	$67	$1,339	$93	$1,861
Planning	$30	$590	$41	$820
Administration	$8	$160	$11	$222
Central Services Assessment	$48	$950	$66	$1,321
TOTAL	$1,048	$20,955	$1,456	$29,119

Table 8: Summary of feasible needs

7. **Special programs.** Special programs meet special needs or mandates. Included in this category are the Transportation and Growth Management Program, ODOT's share of the Oregon Plan for Salmon and Watersheds, Scenic Byways, the Immediate Opportunity Fund and the Bicycle/Pedestrian Program.

   The salmon recovery program and the Immediate Opportunity Fund make up the bulk of the needs in this category. ODOT will retrofit culverts to improve fish passage as part of the salmon recovery program. While these projects may vary greatly in cost, an average culvert retrofit is expected to cost approximately $150,000.

   Special program needs were calculated from individual program estimates.

8. **Construction support.** This category includes project reconnaissance, staff training and personnel that directly support development of projects. The needs estimate was based on a percentage of construction and preservation related costs.

9. **Planning.** ODOT planning activities include policy development, modal and corridor planning, review of local comprehensive plans and transportation system plans, transportation analysis and accident data. Planning funds are also given to metropolitan planning organizations and local governments to support their planning activities.

   Planning needs were based on current funding and assume a decrease in corridor planning and an increase in state involvement with local plans.

10. **Administration.** Administration involves costs for management related to highway planning, operations, projects, preservation and maintenance.

11. **Central services assessment.** Central services include central administration, communications, finance, human resources/organizational development, information services and business services. The needs estimate was based on an assessment of 6 percent of program costs for these services.

User Costs

In addition to state costs for modernization, preservation and other highway needs, there are significant costs experienced by every user of the system. For example, roads in poor condition put extra wear and tear on private and commercial vehicles, meaning that the public spends more money on vehicle maintenance and replacement. Travel speed decreases as a result of both poorer roadway conditions and increased congestion. Declining travel speed results in increased costs to private and commercial travelers. As congestion reaches very high levels, or roadway condition deteriorates to very low levels, safety is also adversely affected, and the public bears additional costs in the form of accident-related losses. These kinds of costs are called "user costs" since they are paid "out of pocket" by highway users.

Currently, Oregon highway users incur an estimated $16 billion per year in highway user costs. This is over 30 times as much as the current annual expenditure by ODOT on all highway programs and administration. User costs will go up in the future due to projected increases in vehicle miles of travel and the resulting impact on highway conditions and congestion. ODOT programs can impact only a portion of future user costs. Whatever ODOT can do to minimize future user costs, however, will return dollars into the Oregon economy in the form of reduced user costs which can then be invested elsewhere.

The Oregon Highway Plan evaluates the return on investment or benefit/cost ratio of its programs. Since the State is concerned about all Oregon residents and industries

and about Oregon's livability and economy, ODOT's concern is with overall benefits of its investments, not with whether state government captures those benefits. User costs and user benefits are of primary concern in this approach to evaluation of investment in the highway system.

Forecasts of vehicle miles of travel (VMT) indicate that VMT will increase by over 40 percent on the state highway system by 2017. This is consistent with forecasts of VMT growth by Metro for the Portland region and by ODOT for all highway travel in the state. VMT growth has direct implications for highway mobility and user costs. If nothing is done to improve currently high volume highway segments and VMT grows substantially, highway mobility will decrease, travel times will increase, and user costs will increase for each user as well as for users altogether.

Impact of Various Funding on User Costs

ODOT has estimated the impacts of various scenarios on user costs for selected categories of investments which are highly correlated with user costs. The Oregon Highway Economic Requirements System (OR HERS) was used to make estimates of user cost impacts of alternative levels of funding for modernization and preservation. ODOT has made parallel estimates of the user cost impacts of operations and safety improvements. ODOT estimated bridge investment impacts not as user costs impacts, but rather as a related "value" of bridges in service by year. No formal estimates of user cost impacts were made for maintenance or special categories.

User cost impacts were estimated as accurately as possible for higher and lower investments in each category. The OR HERS model calculated that the user benefits in the 20th year of the Oregon Highway Plan would be $310 million greater each year for an additional $10 million per year invested in preservation, and about $260 million per year greater in the 20th year for an additional $10 million per year spent on modernization. These marginal benefits in comparison to marginal costs are much higher than could be achieved with any other private or public investment of the $10 million per year increment.

Similar returns on investment accrue from safety and operations improvements. Returns over 20 years from safety investments are estimated at over 20 to 1 in terms of ultimate dollars saved due to fewer fatalities and injuries.

These very high returns from added investments in each category provide assurance that added money over and above today's resources can be wisely spent, but provide little guidance about priorities among categories. The priorities among categories have to be set by first taking care of existing system deficiencies and then by investing in successively higher levels where the dollars have good payoff. Continuing to invest in any one category will result in decreasing returns to scale. Therefore, once critical needs are met in a category, additional resources may go to other categories with a larger backlog of needs. This is the basis for the investment scenarios.

Investment Policies and Scenarios

To meet the state highway system needs, ODOT has developed policies and scenarios to use in planning and prioritizing programs at a range of potential funding levels– from no increases in current state fees supporting the highway system up to a level of funding that can support those highway needs which are feasible to implement.

As funding increases or decreases, various program categories are not increased or decreased proportionately. Difficult choices are necessary under constrained funding. None of the choices yield wholly satisfactory outcomes. However, when the State is not able to fully fund feasible and desirable needs, the goal should be to minimize the short and long term harm to Oregon's economy and livability which will occur when funding levels are inadequate.

At the lowest funding levels, the emphasis is on doing as much as possible to operate the highway system safely and efficiently and to preserve what already is in place, although conditions are likely to continue to deteriorate under such a strategy. Trying to build a larger system of highways (or of other modes) would be counterproductive under very low funding levels because new or expanded portions of the system would not be sustainable.

With higher than minimum funding, infrastructure conditions can be stabilized or improved, and attention and resources can begin to be devoted to a wider range of goals. All analyses have shown that conditions and system performance improve rapidly as more resources above the current levels are added for any of the program categories. The plan has not examined levels of investment which are so high that conditions and performance could not be improved further in a cost-effective manner.

To operate the highway system as efficiently as possible with limited abilities to expand the infrastructure, the plan's investment policies emphasize capacity-adding programs that are not as costly as traditional modernization projects. These include interconnected traffic signal systems and other operational changes, Intelligent Transportation System technologies, access management, off-system improvements, and High-Occupancy Vehicle lanes.

Safety is an element in all the major programs. For example, new extended freeway ramps in the modernization program can ensure that traffic does not extend from an off-ramp of an interchange onto the freeway. The preservation program overlays rutted pavement that may cause drivers to lose control. The operations program installs traffic signals at dangerous intersections. The maintenance program fills potholes and replaces signs and illumination devices. The safety program addresses problems in priority hazardous locations and corridors; the solutions involve better operations or maintenance or traffic enforcement or other changes.

The Highway Plan recognizes that it is critical to maintain alternate modes in order to limit or reduce demand on the highway system in congested areas. At the lowest funding levels, if highway conditions can only be maintained at status quo, it is in the State's interest to maintain at least status quo conditions for alternate modes.

Investment Policy and Priorities

It is the policy of the State of Oregon to place the highest priority for making investments in the state highway system on safety and managing and preserving the physical infrastructure.

ODOT's funding priorities will change according to changes in available revenues. The following scenarios establish funding priorities for highway-related plans and programs at four general funding levels; the first applies at the 1998 funding level. With increases in funding ODOT will progress toward the fourth funding scenario.

1. With funding that does not increase with inflation and subject to statutory requirements and regional equity, address critical safety issues, and manage and preserve existing infrastructure at 77 percent fair or better before adding capacity, as explained below:

    - Focus safety expenditures where the greatest number of people are being killed or seriously injured.

    - Fund modernization only to meet statutory requirements.

    - Preserve pavement conditions at 77 percent fair or better on all roads except for certain Regional and District Highways.

    - Do critical bridge rehabilitation and replace bridges only when rehabilitation is not feasible.

    - Fund operations to maintain existing facilities and services and extend the capacity of the system.

2. Invest to improve infrastructure conditions and to add new facilities or capacity to address critical safety problems, critical levels of congestion, and/or desirable economic development.

    - Address the highest priority modernization projects.

    - Move toward pavement conditions of an average 78 percent fair or better on all state highways.

- Maintain the Bridge Value Index (percentage of total replacement value) at 86 percent.

3. When critical infrastructure preservation, safety and congestion needs are met, pursue a balanced program of additional high priority modernization projects and preservation of infrastructure.

   - Move toward modernization funding to meet 55 percent of feasible needs.

   - Bring pavement conditions up to an average 84 percent fair or better level on all state highways.

   - Maintain bridge conditions at 87 percent of total replacement value and address the critical 1/3 of seismic retrofit needs.

4. With significant funding increases, develop feasible modernization projects, address long-term bridge needs and upgrade pavements to a more cost-effective condition.

   - Move toward modernization funding to meet 100 percent of feasible needs.

   - Bring pavement conditions up to an average 90 percent fair or better level on all state highways.

   - Begin to replace 850 aging bridges and increase the Bridge Value Index (percentage of total replacement value) to 91 percent.

Funding for specific programs will follow these priorities:

Modernization

- Give priority to modernization projects that improve livability and/or address critical safety problems and high levels of congestion.

Preservation

- Give priority to Interstate pavement condition.

- Maintain Statewide Highways at a higher condition than Regional and District Highways, and invest in thicker pavement on designated freight routes.

- Preserve other highways at lower pavement conditions according to their classification. Preserve District Highways at 60 percent fair or better or higher.

- With no increase in state funding, consider the option of a "maintain only" policy for certain Regional/District Highways.

- With increased funding, increase pavement condition level toward an optimal level.

- With significantly increased funding, maintain pavement conditions at an optimal level of fair or better (90 percent fair or better).

Bridge

- At declining funding due to inflation, do critical bridge rehabilitation and replace critical bridges when rehabilitation is not feasible. Do seismic retrofit projects only to maintain the functionality of major river crossings on Interstate 5 and Interstate 84.

- At increased funding, preserve bridge value at the present state, but ignore most seismic retrofit needs.

- With more funding, maintain the Bridge Value Index (percentage of total replacement value) and address the most critical one-third of the seismic retrofit needs.

- With significant funding increases, address the long-term problems of replacing the 850 bridges built in the 1950s and 1960s.

Safety

- Focus expenditures where the greatest number of people are being killed or seriously injured.[10]

- Allow for a reduced number of safety upgrades in preservation projects on highway segments with little or no crash history to increase dollars available for highway preservation.

- Make safety investments based on benefit/cost analysis. The first priority is on preservation projects with a high risk segment. The second priority is stand-alone projects on priority safety segments or spot locations.

[10] These priorities are reflected in the Safety Investment Program used to select safety projects for the Statewide Transportation Improvement Program. The Program identifies where the most people are being killed and seriously injured on the state highway system and applies the most cost-effective measures to reduce the number of crashes.

Operations

- Maintain the existing facilities and services.

- Increase funding for Intelligent Transportation Systems and other operations to increase safety, increase travel time reliability, and relieve congestion especially in congested metropolitan areas.

- With increased funding, take advantage of technological devices to increase safety, decrease travel time, and relieve congestion throughout the state.

Maintenance crews respond to snow, ice, mudslides, and other weather-related conditions to keep the roads open. (Skyline Boulevard, near Mt. Bachelor)

Maintenance

- With existing funding, focus on maintenance of features critical to keeping roads open and safe for travel.

- With increased funding, begin to move toward desired levels of service of features critical to keeping roads open and safe for travel.

- With significantly increased funding, invest in high initial cost solutions that improve service to travelers and minimize long-term spending. Examples range from upgrading substandard guardrail to major culvert and ditch upgrades and include improvements such as durable pavement marking.

Special Programs

- **Scenic Byways:** Position the state and local entities to be able to fund national and state Scenic Byway improvements and facilities mainly through federal funding.

- **Salmon Recovery:** Implement the Oregon Plan for Salmon and Watersheds as directed by the Governor's Executive Order. Fund at appropriate levels.

- **Transportation/Growth Management:** Fund transportation plans and projects in local jurisdictions to support livability and economic opportunity.

- **Bicycle/Pedestrian Program:** Focus the program on identifying simple, low-cost projects on urban highways to improve pedestrian and bicyclist access.

- **Immediate Opportunity Fund:** Fund street, road or other transportation-related improvements needed to respond quickly to economic development opportunities and/or revitalize commercial and industrial centers.

Planning

- Maintain basic planning program needs, including region and central work on Transportation Planning Rule implementation, periodic reviews, plan amendments, development review, access management, corridor plans and transportation system plan assistance. Adhere to funding priorities when developing corridor plans, facility plans and local transportation system plans.

- Maintain basic ODOT long-range planning to comply with statutory requirements for the Oregon Transportation Plan and related modal plans.

- Continue to assist in funding local transportation system planning.

- If not able to maintain the basic planning program, decrease or eliminate ODOT funding assistance for local planning.

Investment Scenarios

The investment scenarios fit these policies and priorities together. They begin with the continuation of current (1998) funding rates.

Scenario 1: Current Funding Continued

This scenario is based on the assumption that funding rates will not rise; there will be no fuel tax increase or other state source increase.

Total Investment – $515 million/year

New Funding Requirements – $0

If current funding rates were to continue, ODOT would focus investment on preservation and maintenance. Modernization spending would be limited to the state legislative minimum (currently approximately $54 million in accordance with ORS 366.507) and the high priority projects in TEA 21. Only the most critical capacity improvement projects and TEA 21 projects would be completed. The emphasis of the remaining funds would be on preservation and maintenance.

Since this scenario assumes that current funding rates will continue, the absolute dollars of revenue would rise as population rises, but inflation and increased highway system use would mean that ODOT would not be able to maintain current conditions in terms of physical condition or mobility. This investment level would lead to higher long term costs to repair or replace system facilities.

Under this scenario, the physical condition of highway infrastructure would decline and congestion would increase.

Projected Highway System Conditions in 2017 for Scenario 1:

- Pavement conditions would decline from 77 percent fair or better, about 2 percent per year.
- Bridge Value Index would decline from 87 percent to 82 percent of total replacement value; funding does not keep up with even the most serious deficiencies. ODOT would place restrictions for truck weight on additional bridges.
- User costs would increase dramatically by over 50 percent per mile of travel, and speeds would decline by 50 percent compared to current levels.

Scenario 2: Protecting Current Infrastructure, But No Preservation of Certain Regional and District Roads

This scenario is designed to maintain the current physical condition of the system as well as possible with limited increases in funding.

Investment – $576 million/year (uninflated) beginning in year 2000.

New Funding Requirements: Approximately 3 cents per gallon gas tax increase to take effect in year 2000, plus adjustments for inflation.[11]

ODOT would focus the first additional dollars on protecting the physical condition of the current system by investing more in its maintenance and preservation programs. No additional money would be spent on modernization beyond the level in Scenario 1. Certain Regional and District roads would receive maintenance treatments, but not preservation treatments. Long-term needs to replace aging bridges and retrofit high-priority bridges to withstand moderate earthquakes would be ignored.

With this level of investment, physical condition of higher volume roads would stabilize at current levels, but overall pavement conditions would decline, bridge conditions would decline, congestion would increase significantly, and mobility would decline.

Projected Highway System Conditions in 2017 for Scenario 2:

- 77 percent fair or better pavement for roads with higher volumes. Overall condition of the system would decline over the long term.
- Bridge conditions would decline slightly, but most critical bridge projects are addressed. There is very little seismic retrofit.
- User costs would increase and speeds would decline, but by much less than under current funding.

[11] Each scenario's description contains a rough estimate of new funding required to match the scenario. These estimates are discussed in more detail in Table 11 on page 185.

Scenario 3: Protecting Current Infrastructure

This scenario is designed to maintain the current physical condition of the system as well as possible with limited increases in funding.

Investment – $599 million/year (uninflated) beginning in year 2000.

New Funding Requirements: Approximately 5 cents per gallon gas tax increase to take effect in year 2000, plus adjustments for inflation.

ODOT would focus additional dollars on protecting the physical condition of the current system by investing more in its maintenance and preservation programs. This scenario is like Scenario 2 in that no additional money would be spent on modernization beyond the level in Scenario 1. Preservation projects would occur on all state highways; safety costs would go up because of the additional preservation projects, but maintenance costs would go down slightly from Scenario 2. Long-term needs to replace aging bridges and retrofit high-priority bridges to withstand moderate earthquakes would be ignored.

With this level of investment, the physical condition of pavement would stabilize at current levels, but congestion would increase and mobility would decline.

Projected Highway System Conditions in 2017 for Scenario 3:

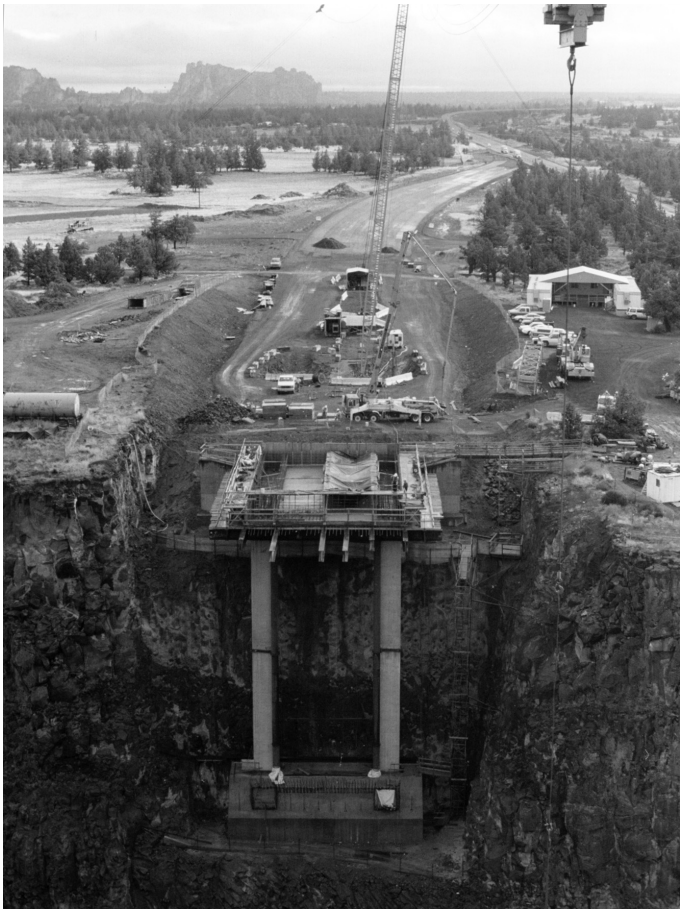
- 78 percent fair or better pavement condition for roads overall.
- All critical bridge projects are addressed, but very little seismic retrofit.
- User costs would increase and speeds would decline but by less than under current funding.

Scenario 4: Protecting the Current Infrastructure with Some Modernization

This scenario focuses investment on preserving and maintaining pavement and bridge conditions as well as possible with limited funding. It would fund about 30 percent of feasible modernization needs.

Investment – $659 million/year (uninflated) beginning in year 2000.

New Funding Requirements: Approximately 10 cents per gallon gas tax increase to take effect in year 2000, plus adjustments for inflation.



The new Crooked River Gorge Bridge will replace a bridge built in 1924 which cannot carry the increasing traffic on Highway 97.

Although most of the funding would be directed to preserving pavement conditions, improving bridge conditions, and improving operations, safety and maintenance, funding would support additional modernization projects. Operational and safety increases could help mitigate increased congestion.

Projected Highway System Conditions in 2017 for Scenario 4:

- 78 percent fair or better pavement condition for roads overall.
- Bridges maintained in their current state, but with very little seismic retrofit.
- User costs would increase and speeds would decline.

Scenario 5: Protecting the Current Infrastructure with Additional Modernization

This level of investment is designed to marginally improve current pavement, bridge and maintenance conditions. Additionally, this scenario addresses high priority capacity-improvement needs (modernization), thus providing greater management of mobility and congestion than the other scenarios.

Investment – $735 million/year (uninflated) beginning in year 2000.

New Funding Requirements: Approximately 17 cents per gallon gas tax increase to take effect in year 2000, plus adjustments for inflation.

This next level of funding would improve the condition of current infrastructure and allow additional high priority modernization projects. Modernization needs would be funded to about $145 million/year. About 43 percent of the feasible projects identified through the review of current state and local transportation system plans and projected needs would be constructed.

Under this scenario, congestion continues to increase over current levels, but less than in the first four scenarios.

Projected Highway System Conditions in 2017 for Scenario 5:

- Pavement conditions would be improved to 80 percent fair or better.
- All critical bridge projects would be addressed; seismic retrofit work would be focused on critical routes. Bridges would be maintained at 86 percent of full replacement value.
- Speeds would be higher and user costs would be lower than under protecting current infrastructure, but still very unfavorable compared to meeting feasible needs in Scenario 7.

Scenario 6: Coping with Congestion

This level of investment is designed to further improve current pavement, bridge and maintenance conditions on all roads. Bridge values are maintained at current levels, and the most critical seismic retrofit needs are addressed. Additionally, this scenario addresses about 55 percent of high priority capacity-improvement needs (modernization), thus providing greater management of mobility and congestion than the previous scenarios.

Investment – $826 million/year (uninflated) beginning in year 2000.

New Funding Requirements: Approximately 25 cents per gallon gas tax increase to take effect in year 2000, plus adjustments for inflation.

This next level of funding would improve the condition of current infrastructure and fund 55 percent of feasible modernization projects. The most critical one-third of the seismic retrofitting of bridges would be done.

Under this scenario, congestion continues to increase over current levels, but less than in the previous scenarios.

Projected Highway System Conditions in 2017 for Scenario 6:

- Pavement conditions would be improved to 84 percent fair or better overall.
- All critical bridge projects and the most critical one-third of the seismic retrofit needs would be addressed. The Bridge Value Index would be maintained at 87 percent of full replacement value.
- Speeds would be higher and user costs would be lower than Scenarios 1 through 5, but still very unfavorable compared to meeting Scenario 7 Feasible Needs.

Scenario 7: Feasible Needs

This scenario is designed to improve pavement conditions to 90 percent fair or better, improve bridge conditions to increase the current value of the system, and complete the list of feasible capacity-enhancing projects that has emerged from the Oregon Highway Plan Needs Analysis. These are projects identified through state and local transportation planning processes and analyses.

Investment – $1,048 million/year (uninflated) beginning in year 2000.

New Funding Requirements – Approximately 46 cents per gallon gas tax increase to take effect in year 2000, plus adjustments for inflation.

This scenario improves the physical condition of highways so that pavements and bridges can be maintained most cost-effectively, operates the system efficiently and completes feasible capacity projects to relieve congestion problems except in places where physical constraints, environmental impacts, high costs and/or political decisions would limit congestion relief. The places with these constraints are mainly in the metropolitan areas. A program to replace the 850 aging bridges built during the 1950s and 1960s would be underway. Seismic retrofitting would be incorporated into the replacement.

Highway physical condition would improve but congestion would increase, although less than above.

Projected Highway System Conditions in 2017:

- Pavement conditions would be 90 percent fair or better overall.
- Bridge value would be increased to 91 percent of full replacement value, and problems with aging of "baby boomer" bridges would begin to be addressed.
- Speeds would decline and user costs would increase compared to current levels, but user costs per mile would increase by less than half the increase under current funding.

These policies, priorities, and scenarios will be the basis for ODOT's Statewide Transportation Improvement Program (STIP), the document that programs and schedules specific construction projects for the next four years. Actual dollar figures will vary between the Highway Plan and the STIP because the Highway Plan figures are 20-year averages and include preliminary engineering, right-of-way and other costs that the STIP does not. The Highway Plan figures are based on needs, and the STIP project costs have to balance to revenues.

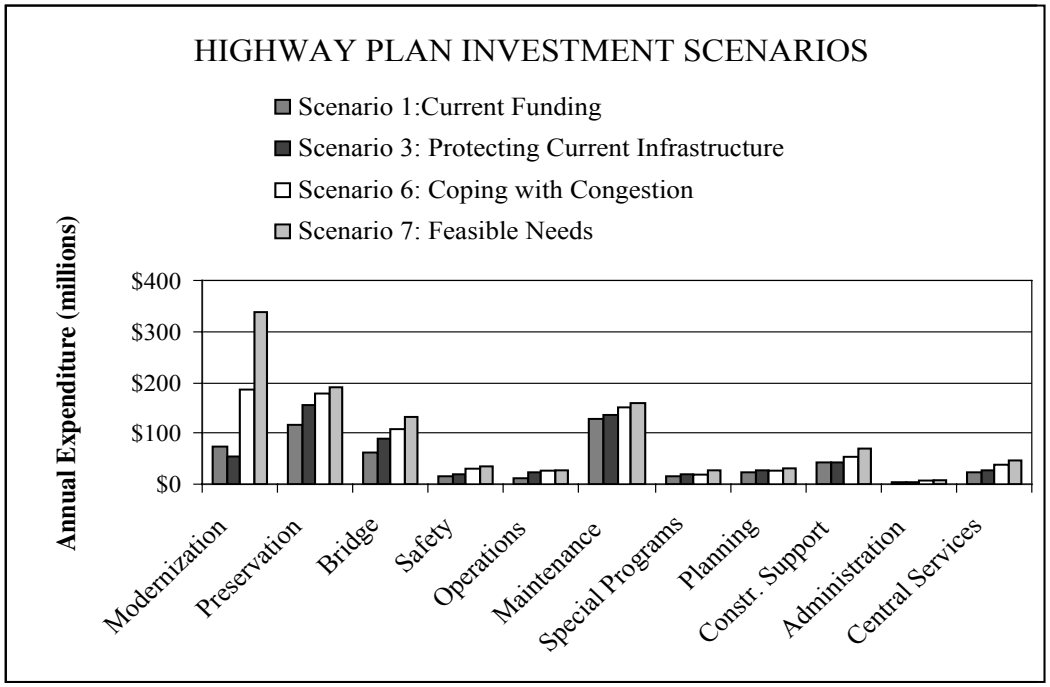


Figure 16: Summary of investment scenarios

This chart illustrates the relative size of the eleven highway programs that contribute to 20-year state highway needs. It also illustrates how spending on each program would vary under the Highway Plan's investment scenarios. The main differences between the scenarios are in the Modernization, Preservation and Bridge categories.

Impacts of Scenarios on User Costs

User costs vary considerably across the scenarios. User costs always decrease much faster than ODOT investment levels increase, for all categories of expenditure and for all investment levels that have been analyzed. In terms of overall benefits that can accrue to Oregon's economy, the highest level of expenditure that was formally evaluated is the most desirable level of expenditure.

None of the alternatives examined, up to and including the alternative with the highest funding level, achieve speeds, user costs and mobility standards as good as current figures.

Table 9 shows the results of using the OR HERS model to estimate the speeds and user costs for the scenarios. The first row of numbers shows initial year conditions. Speeds average around 43 miles per hour for travel on state highways. The average cost per mile, considering ownership and operating costs, safety costs, and travel time costs, is about 82 cents per mile. Total user costs for travel on the state system are estimated at nearly $16 billion per year. Thus, users spend much more on travel costs on the state system than ODOT spends.

SCENARIO IMPACTS ON USER COSTS			
Investment Scenario	Average Speed	Total User Costs Per Mile	Total User Costs Per Year
Initial Year[1]	43.1 mph	82.4¢	$15.9 Billion
Protect Current Infrastructure[2]	21.6 mph	132.1¢	$34.4 Billion
Coping with Congestion[3]	22.6 mph	123.6¢	$32.5 Billion
Feasible Needs	29.0 mph	102.3¢	$28.4 Billion
Feasible Needs with Reduced VMT Growth[4]	31.2 mph	96.6¢	$25.7 Billion

Table 9: Implications of scenarios for transportation system

Notes for Table 9:

1. All values, other than for the Initial Year, represent condition at the end of the 20-year planning period.
2. Approximately 40 percent below Feasible Needs.
3. Approximately 27 percent below Feasible Needs.
4. The maximum likely level of VMT reduction, relative to 20-year forecast, achieved through aggressive transportation demand management programs primarily at the metropolitan planning organization level.

The investment scenarios are shown in terms of the conditions in the 20th year (2017). The intermediate scenarios defined for the Highway Plan, Protecting Current Infrastructure and Coping with Congestion, are shown in the second and third rows of the table. These scenarios result in user speeds and costs which are significantly worse than the initial year. These scenarios also show significantly worse performance than the Feasible Needs scenario (row four). In fact, because user costs go up much faster than ODOT budget increases, all increases below the Feasible Needs scenario have significant negative impacts which far outweigh the budget savings. For example, by the 20th year, any expenditure level below Feasible Needs is costing users 40 times the savings in ODOT highway budget for that year, due to the cumulative negative impact of foregone investments.

For the Feasible Needs scenario with the VMT growth as forecast, speeds will decrease compared to today and user costs will go up, both in total and on a cost per mile basis.

The fifth row shows what speeds and user costs would be by 2017 if Feasible Needs were funded and if the VMT reductions that the metropolitan planning organizations consider to be the maximum feasible were achieved. Speeds increase substantially compared to a higher VMT, and user costs go down. User costs per mile still increase compared to today, but by a lower amount than if Feasible Needs were implemented but VMT was not reduced.

Revenue Projections

It is difficult to accurately predict future revenues since they are dependent on a large number of political and economic variables. The Highway Plan makes general estimates so that investment priorities can be discussed. State highway funding in Oregon comes from both state and federal taxes and fees. Each of these revenue sources is discussed briefly below. This discussion and the numbers cited only cover those revenues that go to the highway programs described above. There are a number of state transportation programs that are not covered by the Highway Plan.

State road user revenues provide approximately 65 percent of state transportation revenues. Oregon's State Highway Fund, which is constitutionally dedicated to highways, derives most of its revenue from three major highway user taxes: vehicle registration fees, motor vehicle fuel taxes and motor carrier fees (the weight-mile tax). These taxes are governed by the concept of cost responsibility (collecting revenues from users based on their fair share of highway costs. Cost responsibility studies are published periodically to ensure that users' shares reflect current conditions. The latest cost responsibility study update was completed in 1995 and assigns 62.3 percent of highway costs to vehicles weighing less than 8,000 pounds and 37.7 percent to heavy vehicles. The 1995 State Legislature reduced heavy vehicle registration fees and weight mile taxes to match this cost responsibility.

PROJECTED HIGHWAY REVENUES			
Year	State	Federal	Total
1998	$346,983,057	$184,257,079	$531,240,136
1999	$364,822,730	$211,757,470	$576,580,200
2000	$369,977,182	$217,371,205	$587,348,387
2001	$375,263,272	$222,597,185	$597,860,457
2002	$381,364,362	$227,419,252	$608,783,614
2003	$386,202,160	$229,322,523	$615,524,683
2004	$392,805,296	$279,526,785	$672,332,081
2005	$398,948,938	$279,526,785	$678,475,723
2006	$405,115,216	$279,526,785	$684,642,001
2007	$410,579,143	$279,526,785	$690,105,928
2008	$415,577,315	$279,526,785	$695,104,100
2009	$420,216,752	$279,526,785	$699,743,537
2010	$424,528,797	$334,432,142	$758,960,939
2011	$427,621,303	$334,432,142	$762,053,445
2012	$431,120,636	$334,432,142	$765,552,778
2013	$434,492,387	$334,432,142	$768,924,529
2014	$437,387,939	$334,432,142	$771,820,081
2015	$440,453,086	$334,432,142	$774,885,228
2016	$442,803,615	$400,318,571	$843,122,186
2017	$445,689,041	$400,318,571	$846,007,612
Total	$8,151,952,226	$5,777,115,420	$13,929,067,646

Table 10: Projected state and federal highway revenues, 1998-2017

In 1998 automobiles paid an annual registration fee of $15 and a state gas tax of 24.6 cents per gallon. Heavy vehicles (those over 8,000 pounds) paid an annual registration fee of between $110 and $415 depending on their weight. In addition, all commercial vehicles with a registered weight of over 26,000 pounds paid a weight-mile tax of between 4.45 cents and 20.4 cents per mile depending on their weight and the number of axles. Vehicles that paid the weight-mile tax did not pay state fuel taxes.

If there are no rate increases, state highway revenues from these sources are expected to average approximately $424 million over the next 20 years, for a total of $8.1 billion. This estimate assumes growth in revenues from additional users of the system, but does not assume any increase in the tax rate. Since motor vehicle taxes in Oregon are fixed amounts (i.e., rather than a percentage of fuel prices), these revenues will not grow with inflation over time.

Oregon also receives highway revenues from the federal government. The federal highway program is financed with proceeds from federal fuel and other transportation-related user taxes and fees. These funds are discretionary and subject to Congressional authorization. The federal Transportation Equity Act for the 21st Century, signed in June 1998, will provide over $246 million annually for Oregon state highways for

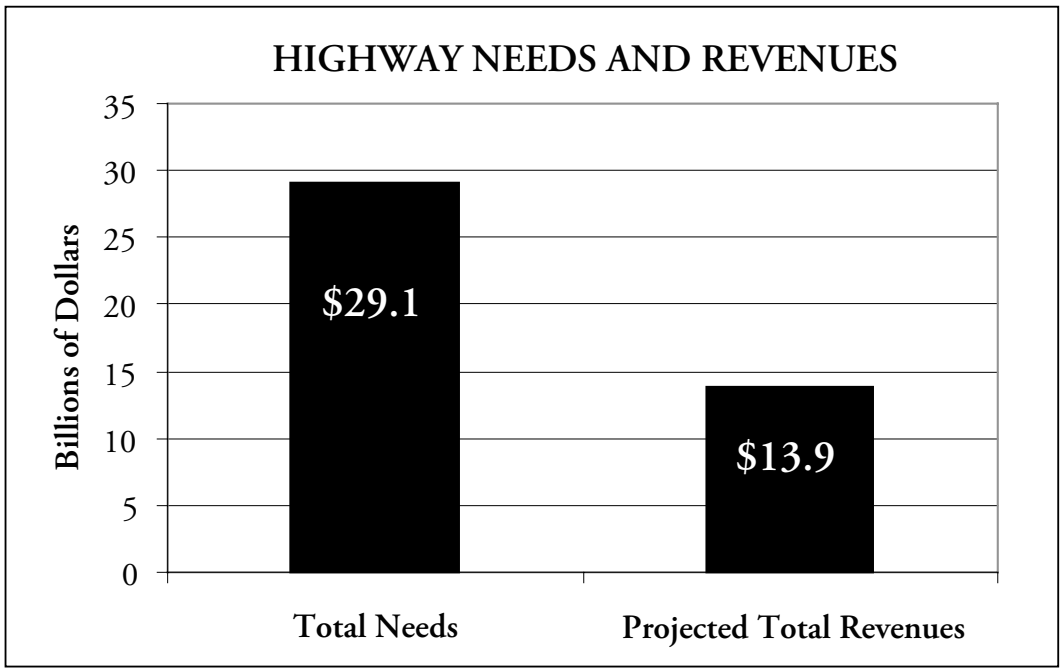


Figure 17: Projection of 20-year highway needs and revenues (assumes 3.3% inflation)

fiscal years 1998-2003. After this point, it is difficult to accurately forecast revenues. This analysis assumes a gradual rise in federal highway funds which reflects an upper limit of what may be achievable under fixed tax rates. Using this assumption, federal highway funds for the State of Oregon are estimated at a total of $5.8 billion over the next 20 years.

Thus, Oregon's total highway revenues for the period 1998-2017 are projected to be approximately $13.9 billion (see Table 10, page 171) if state funding rates do not change.

Summary of Needs and Revenues

If revenues remain at current rates, there will be a shortfall of at least $15.2 billion over the 20-year planning period of the 1999 Highway Plan (Figure 17). This means that all state highway needs will not be met unless highway funding rises.

Tax Increases Required to Meet Scenarios

In order to meet the needs of any of the scenarios above current funding, state highway revenues would have to rise. Table 11 lists estimates of the gas and weight-mile tax increases that would be necessary to meet the needs of each scenario. These are general estimates presented to give a context for long-term state highway needs. The estimates are shown in two ways: a steady increase each year which covers the effects of inflation, and a "one-time" increase with future adjustments tied to inflation.

TAX INCREASES TO MEET NEEDS						
	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Steady Increase	1 cent increase per year (1+1+1…)	1.1 cent increase per year (1+1+1…)	2 cent increase per year (2+2+2…)	3 cent increase per year (3+3+3…)	4 cent increase per year (4+4+4…)	7 cent increase per year (7+7+7…)
Total **new** gas tax by 2018 with steady increase	18 cents	20 cents	36 cents	54 cents	72 cents	126 cents
"One-time" increase + inflation increase	3 cents	5 cents	10 cents	17 cents	25 cents	46 cents
Total **new** gas tax by 2018 with "one-time" increase	19 cents	22 cents	32 cents	44 cents	58 cents	93 cents

Table 11: Examples of tax increases needed to match projected revenues with needs.

Notes for Table 11:

1. The steady increase only meets highway needs (including the effect of inflation) over the full 20-year period. In the next 5-10 years, relatively low levels of new revenues are generated, but this would be compensated for by increased revenues in later years.

2. The "one-time" increase would match needs and revenues in the year 2000. After this increase, there would still need to be yearly increases pegged to inflation in order to meet the needs.

3. Revenue produced by each penny assumes:

   A. There will be an equivalent increase in the weight-mile tax that will maintain the cost responsibility split at current levels (62.3 percent light vehicles/37.7 percent heavy vehicles).

   B. The State will receive 50 percent of any new revenues (the State would receive half of the increase shown in Table 11).

   C. There will be growth in the revenue produced by each penny due to increased highway use.

   D. Taxes take effect in the year 2000.

4. The numbers assume that federal revenues will increase as shown in Table 10.

5. Needs were calculated assuming an average inflation rate of 3.3 percent for the period 1998-2017. This consists of inflation rates under 3 percent until 2003, and rising to 3.9 percent by 2018.

6. The numbers do not include needs for city- or county-owned roads.

Implementation Strategies

The Highway Plan will be implemented through planning, project selection, design and development, operations and maintenance related to the state highway system. Within one year of the Plan's adoption, ODOT will develop an Action Plan that identifies implementation actions and agency responsibilities. More specifically ODOT will:

1. Identify responsibilities and impacts of the Plan related to planning, project selection and development, maintenance and investments.

2. Monitor the implementation of the Plan's policies through performance measures.

3. Conduct a process for examining highway classifications, classifying Expressways and designating Special Transportation Areas.

4. Work with local governments to:

    - Develop a process for identifying and transferring Local Interest Roads.

    - Conduct a demonstration project in each ODOT region to apply the Special Transportation Area highway segment designation.

    - Complete corridor plans and transportation system plans to address Highway Plan policies.

    - Achieve consistency between the Highway Plan and local plans and ordinances.

    - Establish criteria and designate lifeline routes.

    - Develop a policy or strategy for interchange management through the Interstate 5 corridor study or other planning efforts.

    - Establish criteria for considering, evaluating and prioritizing off-system improvements.

5. Develop a funding plan that includes looking at various funding options. These options might include:

    - Increased vehicle fuel taxes

    - Higher vehicle registration fees

    - Increased weight/mile tax commensurate with increased fuel taxes

    - Increased heavy vehicle fees

- New vehicle sales taxes
- Fees on vehicle miles traveled
- Congestion pricing
- Tolls
- State systems development charges

6. Develop an administrative rule for access management procedures.

7. Work with freight interests to identify concerns about freight movements on state highways.

8. Develop best management practices to protect environmental and scenic resources.

Performance Measures

The following performance measures have been developed as a means of monitoring the overall implementation of the Highway Plan. ODOT will use these measures to track progress in meeting the goals of the Plan. In some cases, current and historical trend data already exist. In others, the current or baseline conditions need to be established. Once the baseline data is in place, future trends will be monitored to evaluate how well the Highway Plan is helping ODOT and its partners meet their stated goals in four policy areas. These measures are intended for overall system-wide use rather than for project-specific application. They are intended to guide the implementation and periodic refinement of programs and strategies rather than be used for budgeting purposes.

Goal 1: System Definition

Policy 1B: Land Use and Transportation

1. Percent of Special Transportation Areas where the highway mobility, as measured by volume-to-capacity ratios (v/c), meets the designated standard.

2. Highway v/c ratio within a Special Transportation Area (for corridor planning applications).

Policy 1C: State Highway Freight System

1. Percent of freight system lane miles that meet highway mobility standards during peak hour or two hour peak period.

2. Number and percent of accidents on the designated state highway freight system involving trucks.

Policy 1D: Scenic Byways

1. Percent of customers reporting favorable perception of Scenic Byway aesthetics, safety and performance.

2. Oregon Scenic Byway Committee rating (every three years) of improvement/ degradation overall and for certain routes.

Policy 1E: Lifeline Routes

1. Percent of bridges on lifeline routes with satisfactory seismic rating (potentially bridge health index, sufficiency rating, and/or National Bridge Inventory rating).

2. Number of bridges on lifeline routes brought to satisfactory rating in reporting period.

Additional desirable measures which would be feasible as Geographic Information Systems capabilities are expanded within ODOT include:

3. Percentage of Oregon residents whose lifeline system access has been defined and evaluated.

4. Percentage of Oregon residents whose lifeline system access meets bridge rating standards.

Policy 1F: Highway Mobility Standards

1. Percent of highway lane miles that meet highway mobility standards, by statewide highway classification.

2. Percent of miles on limited-access highways in Oregon urban areas that do not meet highway mobility standards (Oregon Benchmark Number 70).

Goal 2: System Management

Policy 2A: Partnerships

1. Percent of state expenditures saved through cost-sharing and other partnership arrangements.

Policy 2B: Off-System Improvements

1. Net benefit (savings and/or benefits less costs) of off-system improvements.

Policy 2C: Interjurisdictional Transfers

1. Number of route miles designated by ODOT as having potential for interjurisdictional transfer.

2. Number (and percent of potential total) of route miles transferred.

Policy 2F: Traffic Safety

The Oregon Transportation Commission established safety priorities to carry out the Traffic Safety policy when it approved the Oregon Transportation Safety Action Plan (OTSAP). Three of the performance measures included in the OTSAP are directly related to state highway travel:

1. Reduce deaths due to motor vehicle crashes from 1.73 per 100 million vehicle miles traveled (VMT) in 1996 to 1.30 by the year 2010.

2. Increase the percentage of occupants using vehicle safety restraints from 83 percent in 1996 to 90 percent by the year 2010.

3. Reduce the number of deaths due to alcohol and drug-related motor vehicle crashes from 0.72 per 100 million VMT in 1996 to 0.58 per 100 million VMT by the year 2010.

Two additional measures are:

4. Number of accidents with fatalities or serious injury (F/SI) per million vehicle miles traveled.

5. Annual percent reduction in fatal and injury crashes on Category 3, 4, and 5 safety segments, based on 1998 baseline.[12]

[12] The state highway system is divided into five-mile segments, and a tally is made of the number of fatal and serious injury crashes over a three-year period. Category 3, 4, and 5 have had three or more fatal and serious injury crashes during this time period.

Policy 2G: Rail and Highway Compatibility

1. Number of newly constructed at-grade crossings on the state system (target is zero).

2. Number of at-grade crossings eliminated or replaced with grade-separated crossings.

3. Number of at-grade crossings improved through installation of new control devices or improved geometric design.

Goal 3: Access Management

There are no performance measures proposed for the Access Management Policies.

Goal 4: Travel Alternatives

Policy 4A: Efficiency of Freight Movement

1. Percentage of identified obstacles to freight movement that are eliminated through action of the State, or the State in partnership with others.

2. Percentage (or number) of intermodal connectors improved.

Policy 4B: Alternative Passenger Modes

1. Percent of Oregonians who commute to and from work during peak hours by means other than a single occupancy vehicle (Oregon Benchmark Number 73).

2. Vehicle miles traveled per capita in metropolitan areas (Oregon Benchmark Number 74).

Policy 4C: High-Occupancy Vehicle (HOV) Facilities

1. Percent of total person miles of travel that are made in High-Occupancy Vehicle lanes.

2. Percent VMT reduction attributable to High-Occupancy Vehicle lanes.

Policy 4D: Transportation Demand Management

1. Percent of Oregonians who commute to and from work in peak hours in a single-occupancy vehicle.

Policy 4E: Park-and-Ride Facilities

1. Inventory (number) of park-and-ride spaces within and immediately adjacent to the state highway right-of-way, by corridor.

Goal 5: Environmental and Scenic Resources

Policy 5A: Environmental Resources

1. Number of state highway miles with up-to-date natural resource maps relative to the total number of miles needing mapping.

2. Number of culverts retrofitted for salmon relative to the total number of culverts needing retrofitting.

Policy 5B: Scenic Resources

1. Percent of customers by region reporting "favorable or better" perception of the state highway system for aesthetics, safety and performance.